TOWARDS A SYSTEMIC APPROACH TO UNDERSTANDING AND MANAGING INNOVATION IN THE PUBLIC SECTOR: A COMPARATIVE STUDY OF FOUR EU COUNTRIES

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A thesis submitted in partial fulfilment of the requirements of the University of Sussex for the degree of Master of Philosophy in Science and Technology Policy Studies

January 2014

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I hereby declare that this thesis has not been submitted, either in the same or different form, to this or any other University for a degree.

Signature:

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance in Statistics
BPR	Best Practice Research
EUROSTAT	Statistical Office of the European Communities
OECD	Organisation for Economic Co-operation and Development
CAPAM	Commonwealth Association for Public Administration and Management
CIO	Chief Information Officer / Chief Innovation Officer
CIS	Community Innovation Survey
COPS	High Cost Complex Product System
CSR	Corporate Social Responsibility
DEG	Digital-Era Governance
DPEPA	United Nation Division for Public Economics and Public Administration
EU	European Union
EC	European Commission
GNP	Gross National Product
G2G	Government-to-Government Services
G2B	Government-to-Business Services
G2C	Government-to-Citizen Services
G2E	Government-to-Employee Services
HRM	Human Resource Management
HQ	Headquarter
ICT	Information and Communication Technology

IMF	International Monetary Fund
IPAC	Institute of Public Administration of Canada
ID	Identification
IT	Information Technology
KSG	Kennedy School of Government, Harvard University
MBO	Management by Objectives
NAPA	US National Academy of Public Administration
NACE	General Industrial Classification of Economic Activities within the European Communities
NESTA	UK National Endowment for Science, Technology and the Arts
NGO	Non-Governmental Organisation
NIS	National Innovation System
NPM	New Public Management
NIFU STEP	Nordic Institute for Studies in Innovation, Research and Innovation; Centre for Innovation Research
PCA	Principal Component Factor Analysis
PL(1-3)	Research Propositions in the Area of Learning
PM(1-6)	Research Propositions in the Area of Management
PMI	Project Management Institute
PS(1-4)	Research Propositions in the Area of Systems
PSO	Public Service/sector Organisation
PSS	Personal Social Services
PT(1-4)	Research Propositions in the Area of Technology
PUBLIN	Innovation in the Public Sector Project

RG	The Main Research Question
R&D	Research and Development
SAPPHO	A Study of Industrial Innovation / Management of Innovation
SPL	Strategic Project Leadership
SPRU	Science and Technology Policy Research Unit, University of Sussex
SPSS	Statistical Package for the Social Sciences, Computer Programme
SRG(1-4)	Sub-Research Questions
STEP	Minnesota's Service Towards Excellence in Performance
STI	Science, Technology and Innovation
TROIKA	Model of Teamwork for Innovations
TQM	Total Quality Management
TS	Technological System
UN	United Nations
UNO	United Nations Organisation
UNPAN	United Nations Public Administration Network
VNPO	Voluntary and Non-Profit Organisation

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TOWARDS A SYSTEMIC APPROACH TO UNDERSTANDING AND MANAGING INNOVATION IN THE PUBLIC SECTOR: A COMPARATIVE STUDY OF FOUR EU COUNTRIES – ABSTRACT

OTT PÄRNA

This research is about innovation in the public sector. In a time of economic crisis and continued cost-cutting, public sector innovation is essential for governments in order to maintain service standards and find radical solutions for complex challenges. The research question of the thesis asks what are the main characteristics and driving forces of the public service innovation system and do they differ across countries? The research has four perspectives through which the public sector innovation process is analysed: managerial, learning, technological, and systems perspective. As data on public sector innovation is quite rare, this research provides a unique combination of theoretical foundations and exploratory cross-country survey on public sector technological innovations in four European countries – the UK, Denmark, Finland and Estonia. The current research is one of the early empirical exercises (the survey originated from 2005) to study innovation in the public sector.

The main contribution of new knowledge of this thesis is four-fold. Firstly, the purposely developed theoretical framework that gives a structured approach how to understand and manage innovation in public sector services. Secondly, the new conceptual-methodological approach of how to study and analyse the innovation process in public service organisations. Thirdly, the hand-made list of public service innovations from four countries and the database of the survey results. Fourthly, the quantitative analysis and synthesis of the survey results which characterises the innovation process of public service organisations in the survey-countries. Especial value of the research is that it allows understanding the relative importance of different factors (in comparison to other factors) influencing the innovation process in public sector services and shows the dynamics of the public sector innovation system. Research results contribute to the literature of public sector innovation, learning and management, and enriching academic debates around this increasingly important topic. Moreover, the research also analyses the differences of public and private sector innovation as well as innovation-related organisational learning issues, contributing both to theories of evolutionary economics and innovation. Additionally, contributions are made to economic theory, organisational theory, public administration and political science.

ACKNOWLEDGEMENTS

This dissertation is a long and exploratory journey full of different ups and downs, both personal and professional. It is in its final shape thanks to many favourable circumstances, contributors and sacrifices. Perhaps the most important driving force that kept me going was my passion towards innovative governments and societies. I truly believe that innovation in the public sector should not be just a one-off phenomenon lead by some brave people. It should be the underlying philosophy of how successful institutions, countries and societies are run – how they evolve, compete and respond to great global challenges.

I was lucky to have three bright minds from SPRU as my supervisors over time. First and foremost, I thank my early supervisor Prof. Nick von Tunzelmann (with Estonian roots!) for all of his guidance, patience, and instructions in the ways of the research world. Nick is a truly gifted supervisor who knows where to push to keep you going with your thesis. Weekly meetings with him during the first years of my studies were all important milestones to get the next steps done. Thank you Nick!

My supervisors Prof. Joe Tidd and Dr. Paul Nightingale, I sincerely thank you for your contribution, especially in the final stages of my research. Your encouragement, reviews and clear suggestions lead me towards the final submission of this thesis. Your willingness to work with me also brought me back to SPRU to finish my dissertation after working for five years as the founding CEO of the Estonian Development Fund, a public sector venture capital fund and strategic foresight unit of the state created by the Estonian Parliament.

Undoubtedly, SPRU's clear value to its research students is the Research Degree Committees. Therefore, I would like to share my gratitude with my committee chairs Prof. Ed Steinmueller and Prof. Ben Martin, together with their committee members. Your feedback (although sometimes "too straight", but always fair) helped me and many others to get to the right track early enough with our research projects. Thank you also Janet French and Carmen Long from SPRU for your administrative help and patience in every aspect of my studies – you both were kind and supportive to me.

There are several institutions that have contributed financially to the research that produced this dissertation. I would like to thank the NATO Science Programme for awarding me with the Graduate

Scholarship in Science Policy covering the two first years of my expenses and fees, as well as a study trip to the USA – the Kennedy School of Government at Harvard University and Massachusetts Institute of Technology (MIT). Many thanks also to the Finnish Government for providing me the CIMO international mobility stipend which allowed me to spend one year as a visiting research fellow at the Helsinki School of Economics, Centre for Knowledge and Innovation Research (CKIR). Sincere thanks also to the Archimedes Foundation of the Estonian Government for financing two years of the second part of my studies. For giving me a good Asian perspective, I would also like to thank my lecturers and co-participants of the Senior Management Global Leadership and Governance Programme at the National University of Singapore, Lee Kuan Yew School of Public Policy.

During these study years I made many good friends – as schoolmates, as housemates and as soul mates. I would like to acknowledge Katrin Männik, Fernando Perini, Alma Rocha, Tanja Sinozic, Helena Rozeik and Andrew Rozeik. I also fully respect the frustration of my old Estonian friends Aivo Tamm and Andres Koiduste who almost did not see me during the active years of my studies.

Finally, I would like to thank my family. My biggest gratitude goes to my eldest daughter Lola Maria who spent some time with me in Brighton and reached as high as the Sussex University Freeman Centre Newsletter Issue 2 in July 2005. I am very grateful also to my late grandparents Harry and Valve, as well to my parents Priit and Tamara, who never finished asking me when I am going to defend my thesis. So, here it is – thank you for pushing me and for waiting! My final thanks go to my younger daughters Romi Domna and Yoko for accepting my absence while I was finishing this thesis.

"New York City's financial crisis has dramatized in highly visible form the possible consequences of the two way pinch that many governmental jurisdictions experience: increased demands for public services coincident with increased cost for supplying these services. At best, citizens grumble about the tax increases required to pay for increased services, thus jeopardizing the tenure of elected officials. At worse, cities find themselves with insufficient revenues to pay debts under any feasible tax increase, thus facing the spectre of bankruptcy New York style." J. David Roessner (1977).

Is there anything new in this world?

1. INTRODUCTION

> *"Bureaucracy destroys initiative. There is little that bureaucrats hate more than innovation, especially innovation that produces better results than the old routines. Improvements always make those at the top of the heap look inept. Who enjoys appearing inept?"* Frank Herbert.

In a time of ongoing economic instability (which started with the 2007-2008 global financial crises), sovereign debt crises in Europe (but also elsewhere), aging societies, and almost non-growing developed economies together with unemployment, make continued cost cutting in the public sector inevitable. On the other hand, there is a growing need for maintaining service standards and to find radical solutions for complex challenges. Therefore, public sector innovation becomes more crucial than ever before.

This research is about innovation in the public sector. The research question of the thesis asks what is the relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of public service innovation system? The research is based on a combination of theoretical foundations and an exploratory cross-country survey on public sector technological innovations in four European countries – the UK, Denmark, Finland and Estonia. The current research is one of the early case-based empirical exercises (the survey originated from 2005[1]) to study innovation in the public sector. The research has four perspectives through which the public sector innovation process is analysed: managerial, learning, technological, and systems perspective.

The main contribution of new knowledge of this thesis is four-fold. Firstly, the purposely developed theoretical framework that gives a structured approach how to understand and manage innovation in public sector services. Secondly, the new conceptual-methodological approach of how to study and analyse the innovation process in public service organisations. Thirdly, the hand-made list of public service innovations from four countries and the database of the survey results. Fourthly, the quantitative analysis and synthesis of the survey results which characterises the innovation process of public service organisations in the survey countries. As an important contribution, this thesis shows empirically how different internal and external forces and factors within the public service innovation

[1] First published in Pärna and von Tunzelmann (2007).

system influence the innovation process and how they differ across countries. Research results contribute to the literature of public sector innovation and management as well as enrich academic and professional debates around these increasingly important topics. Additionally, contributions can also be drawn for economic theory, organisational theory, public administration and political science.

The results might be also useful for policy-makers and public service managers to successfully encourage and manage innovation in the public sector. Knowing the key features influencing the development and implementation of successful technologically innovative public sector services is a prerequisite in this process. The research also explores to what extent the innovation process differs between the public and private sectors and which managerial and organisational improvements are necessary to innovate in public sector services. Innovation-related learning in the public sector is also analysed in this research.

1.1. Positioning the work in the literature

According to Chris Freeman (1994), there is very little disagreement among economists about the importance of innovation for long-term economic growth. "From Adam Smith to Robert Solow via Ricardo, Marx, Marshall, Schumpeter and Keynes there is virtual unanimity that the long-term growth of productivity is intimately related to the introduction and diffusion of technical and organisational innovations. Yet only Marx in the 19th century and Schumpeter in the 20th could be said to position innovation at the very centre of their growth theory…" (Freeman, 1994: 78).

As governments face increasingly complex challenges, today's innovation – creative thinking and development of new or significantly improved products, services, processes and business models – is no longer the monopoly of the private for-profit sector. Governments need to respond to a variety of pressing demographical, social, environmental, economic, political and ideological demands. Moreover, in many respect, they need to modernise and fundamentally change to keep their countries developing, to get used to permanent fiscal restraints, and to respond to growing citizen demands for efficient, effective, convenient and quality service delivery. On the one hand, these increasingly demanding customers will require more responsive and personalised services as well as want to have a say where and how the country is developing. On the other hand, governments need to engage wider actor groups from society to respond realistically to global challenges. Some people call it Big Society,

others support the "reinventing government" movement or "networked government" philosophy. However, in reality most governments are solving yesterday's problems, still ignoring what Abraham Lincoln once wrote, "dogmas of the quiet past are inadequate to the stormy present."[2]

Innovation should become an organic part of public affairs, strategy and action. Mulgan (2009) even stresses that it is a public good, which tends to be underproduced because of inadequate incentives. It becomes clear that a radical new approach to innovation in public services and even in models of state management is needed to address the major social and economic challenges in a period of massive financial constraints. Innovation should become a natural and integrating discipline in government.

In the light of the global crisis (2007-2012), it becomes even clearer that failure to think differently and to innovate in public services creates imbalances in societies and additional fiscal restraints. Moreover, one should also not forget that public sector innovation can act as a springboard and stimulator for innovation at large – leading to increased R&D, emergence of new business models, knowledge (and innovation) spillovers, etc. Indeed, despite the importance of the topic, innovation in the public sector and its services is little studied (Teofilovic, 2002; Osborne and Brown, 2005; Nelson, 2008; Mulgan *et al.*, 2008) and even less systematically practiced. Public sector innovation literature is also often consultancy-based, so-called 'grey literature', and therefore less academic, less critical and rarely research/survey-based. Accordingly, the bibliography of this thesis is also divided into two separate sections – scientific references and non-scientific (grey) literature references.

This does not mean that there is a lack of research in public services as such. From political science and public administration to economics, there are many studies and analyses over time of how the public sector can be modernised, reinvented, decentralised, better organised and managed, programme run, efficiency secured, etc. See for example Dunleavy *et al.* (2005), Eadie (1996), Golembiewski (1996), Hale (1996), Hale and Williams (1989), Hood (1991), Ingraham and Jones (1999), McLaughlin *et al.* (2002), Mohr (1999), (OECD 2000), Osborne and Gaebler (1992), Peters (1994), Willcocks and Harrow (1992).

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[2] President Abraham Lincoln, annual message to Congress, December 1, 1862. The Collected Works of Abraham Lincoln, ed. Roy P. Basler, vol. 5, p. 537. This passage was quoted in the preamble to the 1968 U.S. Republican Party platform.

However, one can argue that there is a big difference between just good governance and innovative governance – one is doing things right, another is doing the right things in the best possible way, to challenge the status quo and to introduce fundamentally new business models. This is not necessarily doing more as a state (e.g. in financial terms), but doing things better, more effectively, not just more efficiently. Moreover, if looking from the societal perspective, today's innovation-based economy means innovation as a way of life across different sectors, disciplines and professions. Perhaps most importantly, it means innovation across different boundaries. Therefore, cooperation and mutual learning between private, public, academic and non-for-profit sectors becomes crucial for states and nations to succeed. This is also supported by economists who estimate that more than half of today's economic growth comes from innovation and new knowledge (see Helpman, 2004), which, however, is increasingly interdisciplinary and occurs between the private and public sectors (e.g. medical services, green economy).

The difference between innovation and daily improvements are illustrated by Richard Nelson (2008: X) in the following way: "in … research concerned with innovation, innovation is seen as a purposive act or set of acts aiming to do something better, to meet a new need or to respond to new circumstances. The conception of trying something new, and not simply making a different choice among prevailing and well perceived alternatives, is an essential part of the innovation concept."

Except a few early attempts (e.g. Mohr, 1969; Gray, 1973; Roessner, 1977), most of the public sector innovation literature is relatively new, starting predominantly from the USA, Canada and the UK (Altshuler, 1997; Altshuler and Zegans, 1997; Bartlett and Dibben, 2002; Bekkers *et al.*, 2011; Berry, 1994a, b; Berry and Berry, 1999, 2007; Bason, 2010; Borins, 2001a, b; Considine *et al.*, 2009; Damanpour, 1987; Damanpour and William, 1984; Damanpour *et al.*, 2009; Hartley, 2005, 2006; Kimberly and Micheal, 1981; McCormic, 2003; Moore and Hartley, 2013; Mulgan, 2009; Osborne and Brown, 2005; Shergold, 1997; Sørensen and Torfing, 2005, 2010, 2011; Teofilovic, 2002; Walker, 2008; Walker *et al.,* 2002; Walker *et al.,* 2011; Zegans, 1997). Authors are also tackling innovation from the risks and obstacles perspectives (Bhatta, 2003; Kubr, 1988). As one might expect, some of the literature also tackles the similarities and differences of the public and private sector innovation (Earl, 2004; Grout *et al.*, 2003; Halvorsen *et al.*, 2005; Koch and Hauknes, 2005; Miles, 2004; Oracle, 2003; Tomkins, 1987; Vinten, 1992; Willcocks and Harrow, 1992). There are also authors who elaborate the

topic of public policy innovations and innovation in policies (European Commission, 2002; Kinder, 2002; Kingdon, 1984; Osborne and Brown, 2005; Polsby, 1984; Roberts and King, 1989; Schon, 1971) as well as successes and failures of government and policy learning (Dolowitz and Marsh, 2000; Etheredge and Short, 1983; Kemp and Weehuizen, 2004; Johnson and Lundvall, 2001). Authors have also dealt with the broad but important issue of public entrepreneurship (Kingdon, 1984; Osborne and Brown, 2005; Osborne and Gaebler, 1992; Polsby, 1984; Roberts and King, 1989; Schon, 1971; Teofilovic, 2002; van Mierlo, 1986). Indeed, Radošević (2006) argues that systematic aspects of public entrepreneurship as a policy challenge needs deeper understanding and suggest undertaking a series of case studies of entrepreneurial and systems of innovation functions aimed at developing empirically based taxonomies for the public sector. Finally, there are also some materials available dealing with the growing areas of social innovation (Mulgan *et al.*, 2008), innovation motivators such as innovation awards (Altshuler and Zegans, 1997; Borins, 2001c, d; Hale, 1996), and citizen/consumer engagement (Dooren *et al*., 2004; OECD, 2001a; Peters and Savoie, 2000).

One of the fundamental challenges to understand and boost public sector innovation is the fragmentation issue related to the definition of innovation. This is supported by both the real-life practices as well as related literature. There is a blurring between politically determined governmental reforms (e.g. deregulation, 'agencification') and narrowly understood public sector innovation (e.g. quality certifications for the provision of social services, e-prescriptions). Indeed, the real world challenges require more fundamental innovation philosophy from governments and nation states. However, in order to suggest or expect radical innovations in state affairs taking place, one should have quantitatively routed data and an understanding of which factors really influence innovation processes in the public sector. Therefore, the present research focuses on these issues. This is achieved by researching technologically innovative public sector services, mainly e-services, in four countries.

Despite the several writings related to innovation in the public sector during the last decade or more, there are strong limitations behind the research. According to Osborne and Brown (2005), much of the literature is full of normative assertions and/or pejorative arguments with little serious empirical work behind it. There is also growing awareness that there is a need for more systematic and comparable data on innovation in the public sector and its services (Koch and Hauknes, 2005). The existing attempts to study innovation in the public sector provide good descriptions of the work undertaken in public

organisations, however, there is a lack of attempts to analyse innovation as a process itself (Osborne and Brown, 2005). A similar situation surrounds the social innovation phenomenon, where there are almost no major datasets or long-term analyses about it, and very few signs of professional academic interest (Mulgan *et al.*, 2008). Experts argue that a lack of knowledge about social innovations impedes the many institutions interested in this field, including innovators themselves, philanthropists, foundations and governments, and means that far too many rely on anecdotes and hunches.

As a result, the situation is also methodologically poor – we lack the knowledge of how to define, understand and encourage innovation in the public sector and/or services. The present research aims to cover some of these shortages in its own exploratory way. Common to the interdisciplinary approach practiced at SPRU, this quantitatively routed research is surrounded by an original composition of literature, coming from both the public as well as the private sector. It brings together some key contributions of relatively fragmented and young literature of innovation in the public sector, grounding partly on decades-long knowledge of innovation in the private sector, and partly flourishing from older modernisation waves of public bureaucracies. As public sector innovation has evolved over stages (Bason, 2010), although overlapping, the current research is positioned in this timeline (see chapter 2). The stages roughly follow the overall trajectory of public management since the early 1970s, which Benington and Hartley (2001) have characterised as 'traditional', 'new public management', and 'networked government'.

It is generally known that innovation is interdisciplinary and multifunctional. Its theory is not a formal and established theory, but a set or a combination of various disciplines: economics, management, organisational learning and psychology, cognitive theory and systems theory (Røste, 2005). On the contrary, most innovation texts tend to emphasise single dimensions such as research and development management, production and operation management, marketing management, product development or organisational development (Tidd *et al*., 2001). Moreover, in private sector innovation, there are interlinkages between micro-level foundations and macro-level growth and development behaviour (von Tunzelmann, 1995). Similar dilemmas appear if one wants to understand public sector innovativeness at the national level – it disaggregates down to the level of single public organisation or even its unit. Only once we understand how this micro-level innovation happens, or why it does not,

can we extrapolate this knowledge to a wider context and try to understand how to make more fundamental innovations in state affairs realistic.

Innovation research is also a combination of evolutionary theories as a dominating perspective behind innovation (Nelson and Winter, 1982; Nelson, 1987, 1995). Therefore, within the evolutionary paradigm, the second part of the literature review draws a cross-disciplinary conceptual framework for further survey and empirical analyses, which has the following four layers:

Managerial perspective – in the majority of ways, innovation is still an organisational issue; success is multi-factored as there are many organisational and managerial issues related to innovation and it might (or might not) be linked to technology (Cooper and Kleinschmidt, 1988; Gallouj 2002; Manz *et al.*, 2000; Peters and Waterman, 1982; Rothwell, 1977 and 1992; Rothwell *et al.*, 1974; Schumpeter, 1936, 1947 and 1950; Terry, 1986; Tidd *et al*., 2001).

Learning perspective – the role of knowledge in the innovation process is strongly emphasised by many theoretical literatures; knowledge is seen as the fundamental resource in the modern economy, and accordingly the most important process seen is learning (Cohen and Levinthal, 1989, Cowan *et al.*, 2000, Dosi, 1997; Lundvall, 1992 and 1993; Lundvall and Johnson, 1994; Metcalfe, 1998; Nelson, 1995; Teece *et al.*, 1997, Winter, 1984).

Technological perspective – it is widely acknowledged that technological change and innovation are major drivers of economic growth and lie at the very heart of the competitive process; technological and information advances (although risky) are seen as once-in-a-century possibilities for transforming the government as they have done the business world (Dunleavy *et al.*, 2005; Earl, 2004; Eggers, 2005; Hamel, 2000, Heeks, 2001 and 2006; Jorgensen and Klay, 2001; Magnus, 2007; Tiits and Rebane, 2009; The Standish Group, 1995).

Systems perspective – innovation mostly takes place in a system, consisting of individuals, firms and institutions, and within a certain cultural and regulatory framework (Carlsson and Stankiewicz, 1993; Freeman, 1987; Goldsmith and Eggers, 2004; Edquist, 1997b; Enzing and Kern, 1999; Lundvall, 1992; Malerba, 2002a, b, c; Nelson and Rosenberg, 1993; OECD, 1997). Most innovation processes start within companies (institutions) trying to solve certain problems. Through this learning process the

company will make use of various sources of competences and knowledge in the innovation system, being those customers, suppliers, consultancies, patents, or various research institutions. Systemic innovation research is therefore often also company (or institution) centred (Røste, 2005).

1.2. Research questions

This research was planned to lead us towards a more systemic approach for understanding and managing innovation in the public sector. The underlying assumption of this thesis is that the empirical and quantitative examination of internal and external factors influencing the innovation process in public sector services can inform policy intervention and organisational/inter-organisational development in this broad and complex area. This analysis can be useful to understand which organisational capabilities the respondent's organisation improved internally in order to innovate and which capabilities they obtained externally; did they have any previous experience with similar innovations and had they learned from the previous experience (internal and external, positive and negative) while innovating. It also opens up the main goals of the innovations and their alignment or misalignment with the actual results. Perhaps most importantly, it helps to understand the relative (i.e. in comparison to other factors) importance of different factors influencing the innovation process. It shows what are the most and the least important factors (internal to the organisation and external) supporting and hampering the innovation process. The study also shows the country, field and innovation-type specific determinants of the innovation process in public sector services.

The main research question (RQ) of the thesis is the following: What is the relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of public service innovation systems in four European countries?

In order to conduct the analysis, a four layer conceptual framework is used: managerial perspective, learning perspective, technological perspective, and a systems perspective. These dimensions are associated with the following four area-related sub-research questions:

- Managerial perspective – What are the key features influencing, supporting and hampering, the development and implementation of successful, technologically innovative public sector services (SRQ1)?

- Learning perspective – Which managerial and organisational improvements are necessary to innovate in public sector services (SRQ2)?
- Technological perspective – What is the importance of technological knowledge in the public service innovation process, where and how is it developed (SRQ3)?
- Systems perspective – What does the composition and dynamics of public sector (service) innovation system look like across countries (SRQ4)?

These four sub-research questions open up the innovation process in public sector services while answering the main research question. We have also developed specific propositions related to these four areas, coming partly from the theoretical literature and partly from the existing empirical studies carried out in the public sector, to be tested throughout the thesis (see table 4.1).

1.3. The context, scope and unit of analysis

Due to theoretical and methodological limitations of the present subject, this research is exploratory. The empirical research focuses on key factors influencing, supporting and hampering the development and implementation of successful, technologically innovative public sector services in four countries: the UK, Denmark, Finland and Estonia. There are four reasons behind the selection of these particular countries, see chapter 5.

The basic unit of analysis for understanding the innovation process in public sector services is a specific, successful (i.e. existing), technologically innovative public service ('the case'; mostly electronic or mobile service, see annex 9), developed and implemented by an actual organisation, and which directly or indirectly benefits citizens or customers. In defining the research subject and objects, the fundamental ideology of the Oslo Manual (OECD/Eurostat, 2005) has been followed, where innovation can appear in the form of a new or improved product, service or process. However, we have further developed the definitions, describing the research subject, from the perspective of the current research. Due to the theoretical and methodological limitations described earlier, the choice and structure of theoretical foundations, the methodology, the case definition as well as the sample developed for the study are experimental, as a result of this particular multidisciplinary exercise (see chapter 5 for further elaborations).

From the methodological perspective, in addition to the questionnaire based case study survey, this research uses propositions and statistical techniques supporting the analysis of the results (also taking

into account the research goals, size and nature of the research sample, and the logic of the questionnaire). In particular, descriptive statistics, principal component factor analysis, and univariate (ANOVA) analyses are performed.

This is also a best practice research by its nature, i.e. only existing technologically innovative public services in four countries are analysed. Reasons why some services do not exist, do not work or have failed in their development process are not analysed in this research. This method (also named best practice research) is supported by the fact that the purpose of the research was to examine the environment in which the innovation occurs, rather than to explore the innovations themselves. This type of research is not new. Inspired by Peters and Waterman's (1982) work on excellence in private sector firms, the best practice researchers have attempted to identify the characteristics of successful and innovative public sector organisations (Barzelay, 1992; Osborne and Gaebler, 1992). Today, best practice research is an important stream of public management research, especially in the area of policy research (Borins, 2001b). The author is aware of the possible shortcomings of the method, such as selectivity, sustainability, and comparability (see for criticisms Borins 2001b, Lynn 1996, Overman and Boyd, 1994), and has therefore tried to avoid them.

1.4. Limitations and boundaries

Innovation in the public sector is a relatively new research area and there were only few empirical and almost no quantitative studies in this arena while this research was carried out. This created the first large challenge, which was methodological – how to define and understand innovation in the public sector. Although given his best, the author takes full responsibility for the results of this exercise and the shortcomings this journey with limited resources might have had. The results of this thesis surely do not answer all of the questions one might have related to the topic of governments and public bureaucracies innovating. Therefore, explorations throughout the thesis have their boundaries and limitations.

The empirical part of this research is a variation of a case study method, using questionnaires to produce qualitatively analysable data. This method indeed has also some limitations. For example, case studies typically rely on descriptive information provided by different people and this leaves room for important details to be left out. Moreover, much of the information collected is retrospective data,

recollections of past events, and is therefore subject to the problems inherent to memory and attribution bias (Dougherty, 1992). Case studies also often involve only a few actors or organisations and therefore may not be representative of the general group or population. However, these limitations are solvable and, to some extent, they can be considered as a 'natural side effect' of an exploratory study with its limitations.

There are also challenges related to the fact that this is a best practice research by its nature, as said earlier. However, as experiences have shown, related limitations such as selectivity, sustainability and comparability, can be overcome.

From the theoretical perspective, much of this thesis is about moving towards the understanding of how the public service innovation system looks and works. However, one should be aware that literature knows several systemic frameworks developed for describing and illustrating the innovation and/or business process and/or knowledge flows and/or competitiveness. Starting from well known concept of national systems of innovation (Freeman, 1987; Lundvall, 1992; Nelson *et al.*, 1993; Edquist, 1997b; OECD, 1997) to sectoral systems of innovation (Breschi and Malerba 1997, Malerba, 2002a, b, c) to technological and socio-technical systems (Senker, 1999) to high cost complex product systems (CoPS) (Hobday, 1998 and 2000) to systems of competitiveness (Porter, 1980 and 1990). There are also many terms in the resent literature that uses networks to describe knowledge-related interaction inside groups, firms and sectors (Perini, 2008). Some of the terms are innovation networks (Frenken, 2000; Zander, 1999), networks of innovators (DeBresson and Amesse, 1991; Powell and Grodal, 2005; Soh and Roberts, 2003), learning networks (Bessant and Francis, 1999; Teixeira *et al.*, 2006), knowledge networks (Hansen, 2002; Owen-Smith and Powell, 2005; Seufert *et al.*, 1999), project networks (DeFillippe and Arthur, 1998; Sydow and Staber, 2002) and R&D networks (Birkinshaw, 2002; Hagedoorn *et al.*, 2005). There are certainly differences between these concepts; however, they do also overlap to certain extent.

While developing the theoretical logic as well as the conceptual approach for the empirical study, this thesis uses only a fraction of the knowledge developed through these comprehensive streams of literature. This research emphasises the public service innovation case (the unit of analysis) together with its surroundings (organisation, learning environment, external environment) influencing the innovation process.

In addition, this research does not investigate the effects of particular innovations, the diffusion of innovations within and to the public sector, or the usage of these particular services by the clients/citizens. The study rather explores the environment in which the service innovation in the public sector occurs. There is also no claim that the results presented here represent the full arena of public service innovation in the four countries under supervision, however, the best was made to find out the majority of technology intensive innovations (mostly electronic or mobile services) available at the date of the study in 2005. Moreover, as the implementation of technological innovations in public service tend to be cyclical, one can claim that the majority of the major technological innovations, or one early wave of them (particularly e-services with basic functionalities), were up and running by the time of the survey in these countries (e-Tax offices, e-Custom offices, e-Stat offices, different registries, etc.).

Finally, the research of innovation in the public sector and public service organisations is in its early stages. Therefore, the theoretical, methodological and empirical explorations of this research can be used as an alternative view to move forward – to build up more coherent and systematic approaches or frameworks in which to understand, analyse and manage innovation in the modern public sector.

1.5. The organisation of the chapters

The thesis will comprise two major parts. The first part consists of a review of the fundamental theoretical and conceptual literature related to the research subject and will support the establishment of the research framework for analysing the innovation process in public sector services. The second part consists of exploratory empirical research and analysis, as well as the synthesis of the research findings from a systems perspective together with the key implications for the literature, policy recommendations and further areas of research. The structure of this thesis is as follows. The second chapter reviews the literature focusing on key debates on characteristics of the innovation process in public sector services. The chapter starts with an analysis of the evolution of innovation in the public sector and respective contemporary challenges; it then draws up the main differences between the public and private sector innovation, and analyses other modernisation waves, typologies, characteristics and trends of innovation in the public sector. Chapter three discusses the measurement of innovative activities in the public sector in the previous empirical research; it also positions the

present research within the wider context of public sector innovation studies. The fourth chapter defines the theoretical framework for analysing the innovation process in public sector services and opens up four respective streams of literature related to that framework. Chapter five summarises the methodological procedures used in the empirical research. The sixth chapter analyses the empirical study results from the perspective of multidimensionality of the factors influencing innovation in public sector services. Chapter seven performs principle component factor analysis on the study results in order to analyse group performances of factors influencing the innovation process. The chapter also analyses country, field and innovation-type specific determinants on the innovation process in public sector services. The eighth chapter synthesises the empirical results of the study from the systems framework perspective, as well as presents the main research findings. The final chapter comprises a summary of the key conclusions, discusses the key implications for the literature, recommendations to public service managers and policy-makers, the boundaries and possible generalisations of the current research as well as areas for further research.

2. THEORETICAL BACKGROUND: EVOLUTION OF THE CONCEPTS OF INNOVATION, MODERNISATION AND TRANSFORMATION PROCESS IN THE PUBLIC SECTOR

> *"If you're not failing every now and again, it's a sign you're not doing anything very innovative."* Woody Allen.

The aim of this chapter is to bring together some key contributions of relatively fragmented and young literature of innovation in the public sector, relying partly on decades-long knowledge of innovation in the private sector, partly on different modernisation and transformation waves of public bureaucracies. We have to acknowledge that public sector upgrading is a continuum between grand radical public sector and service provision innovations, to implementation of IT in e-government, to more modest organisational improvements. However, even if the fundamental nature of innovation drivers in government might be similar across these innovation streams, while studying innovation in the public sphere, one should clearly focus.

This chapter should give us a more comprehensive and structured view on how innovation in the public sector is theoretically understood and seen. The chapter is divided into five sub-chapters. The first sub-chapter opens up the evolution of the innovation phenomenon in the public sector and some contemporary challenges faced by governments and the public sector more generally. The second sub-chapter analyses similarities and differences of the innovation process between the public and private sectors. The third sub-chapter analyses the typology, characteristics and trends of innovation in the public sector known from the literature. This is followed by an analysis on other progress, modernisation and transformation waves in the public sector. The chapter ends with a short summary and introduction to the next chapter, analysing the existing empirical innovation studies conducted in the public sector and positions present in empirical research within this context.

2.1. Evolution of innovation in the public sector and contemporary challenges

The race between global crisis, aging societies, environmental challenges and permanently

unsustainable public finances in most developed countries makes it evident that failure to think radically differently and to innovate in the public sphere creates not just imbalances in societies and additional fiscal restraints, but also fundamental challenges to the sustainable and peaceful existence of these counties. Indeed, it has been argued and successfully demonstrated that public organisations are relatively stable and that prior behaviour is a major determinant of future behaviour (O'Toole and Meier 1999, 2003).

Bekkers *et al.* (2011) argue that innovation represents a challenge to public administration in two different ways. First, the public sector, and subsequently public administration, constitutes the foundation for a more innovation-driven economy. Without a public sector adapted and geared up to a different form of knowledge-based economy, the aim of making society and the economy more innovative will inevitably fail. Second, a future society requires that the public sector itself becomes innovative in order to face a number of challenges. Societal threats such as climate change, crime and international economic competition force the public sector to rethink the choice of priorities, solutions and instruments. In particular, this is because of a number of social and political developments (e.g. individualisation, globalisation, etc.) in (Western/European) societies have undercut some of the 'linkages' between various social actors thereby depriving governments the capacity of solving (cross-sectoral) 'wicked problems'.

The increasing economic importance of science and technology has necessitated the development of various intellectual tools needed to understand innovation (Martin and Nightingale, 2000). However, despite there being more than four centuries of academic work around the phenomenon of innovation, it has predominantly developed around the private sector. The balance of effort has swung in favour of the public sector in the past decade, but even in 2012 there are at least 10 times more studies on innovation in the private sector as compared with innovation in the public sector (León *et al*., 2012). Therefore, theories, data and tools on public sector innovation are nowhere near as advanced as they are for the private sector. According to Matthews *et al.* (2009) just over half (51.1 per cent) of the 167 academic journal articles examining public sector innovation tracked by the extensive Thomson-Reuters database of academic journal publications in the period 1971-2008 were published in the three years: 2006-2008. The growth in the volume of the non-academic literature (also less critical than academic or private sector innovation literature) produced by governments and non-government

organisations (technical reports, working papers, consultancy reports, public sector publications), although harder to track numerically with the same rigour, also appears to exhibit the characteristics of an emerging field. This recent rise in interest is not dissimilar from that exhibited by the more general literature on innovation (24 per cent of the 1971-2008 output has been published in the 2006-2008 timeframe), as Matthews *et al.* (2009) state.

Conversely, according to Kelman (2012), since the end of 1950s, public administration as a research field has become separated from the mainstream social science and mainstream organisational studies that has resulted in what he calls "The public administration ghetto", e.g. a too small number of scholars studying public administration today and with too low quality. He and his colleague analysed the articles of Administrative Sciences Quarterly (one of the main journals that deals with studies of organisation) since its beginning in 1958. They classified them according to their focus – are they about government, business, non-profit, or mixed or general theory articles. At the beginning, business articles accounted for around 20 per cent and government articles around 30 per cent of all the articles. At the end of the period (2002), business articles accounted 70 per cent and government articles only about 4 per cent, meaning that during this period essentially mainstream scholars studying organisations stopped studying government, and started studying firms.[3] He summarises in his speech that "government needs help, governments often are not performing as they should be, and academics who should have the responsibility to help them as governments are an important part of the organisations world, they do not do it."

In addition, the vast literature on innovation systems has largely tended to ignore the role the public sector plays in innovation processes. Making a sharp distinction between the private and public sector often implies perceiving the public sector as a regulatory framework for innovation in the private sector, and as a passive recipient of innovations from the private sector (Bugge *et al.*, 2010). Public sector institutions are often seen as conservative and bureaucratic, and the changes in the public sector are often understood as consequences of innovations outside the public sector (Windrum, 2008) –

[3] Today in the U.S., the Academy of Management has 17,000 members, the American Society of Public Administration (research section) only 355 members, and the American Political Science Association (Public Administration Section) only 515 members (see Kelman, 2012).

abnegating the responsibility of being continuously creative and innovative in the public sector 'in-house'.

However, against the common wisdom, two of the most profound innovations of the last 50 years, the Internet and the World Wide Web, both came out of public organisations (Mulgan, 2007): DARPA in the first place, CERN in the second.[4] "Looking further back, business was not particularly innovative for most of human history, at least until the late 19th century. Instead, the most important innovations in communications, materials, or energy came from wealthy patrons, governments, or from the military," says Mulgan (2007: 4). He concludes that "the idea that businesses and markets are powerhouses of innovation, or "innovation machines" to use William Baumol's (2002) phrase, is a very recent one" (ibid.).

An alternative way how innovations can be introduced into the public sector (and simultaneously creativity in the private sector can be boosted) is through procurement. Even though only a small part of public procurement involves new technologies, this is still a major contributor to the introduction of innovations in the public sector. Public procurement will normally account for 10-15 per cent of GNP in industrialised countries (Geroski, 1990). Public procurement is becoming an important issue also for innovation policies, based on the idea that it can be used to promote innovation in businesses. In terms of measurement, procurement can potentially affect innovation in two directions: contributions to innovation in the organisation itself and promoting innovation in other organisations (Bloch, 2010). An expert group report on public procurement for innovation (European Commission, 2005a) examined the role of procurement for innovation. Among the main issues identified were:

- Whether a systematic approach is used in gearing procurement practices to innovation;
- Intelligent customers (i.e. trained purchasers that have the knowledge needed to demand innovative solutions);
- Early engagement of suppliers (getting their feedback on what is feasible and how tenders and projects should be designed);
    - Tenders and contracts (role of EU directives and other regulations; specification of tenders and contracts);
- Details on actual contracting work
    - Interaction with suppliers, management of contracts;

[4] DARPA is the Defence Advanced Research Project Agency, the central R&D organisation for the U.S. Department of Defence. CERN is the European Organisation for Nuclear Research, which is the world's largest particle physics centre.

- Objectives of procurement (e.g. eco-innovation);
- Types of procurement.

Moreover, much wider than public procurement is the part of public services and public administration in the whole of the European socioeconomic activity. According to Thenint (2010), Europe's public services account for between 40 per cent and 55 per cent of GDP – compared to 32 per cent in the United States, 26 per cent in Japan, 16 per cent in China or 17 per cent in India. Public services-related employment accounts for between one-quarter and one-third of the total EU working-age population, and public employment (civil servants) represents more than 15 per cent of the total employment in the EU. Kelman (2012) also shows that in terms of its annual budget, the U.S. Department of Defense is larger than the annual sales of ExxonMobil or Walmart (the two largest private corporations in the U.S. in terms of annual sales). Therefore, the important role of public services as demonstrators, setters of standards, lead markets (and also procurers), all make their contributions to innovation and their role in innovation in other sectors, extremely significant. Thenint (2010) believes that public services could even become a comparative advantage for European competitiveness, by creating innovation-conducive environments – world challenges such as demographic change, pollution, and security concerns are creating new demands for public services, and the public sector may be a strong driver for EU leadership in these domains too.

Indeed, in the public sector, innovation has never achieved comparable status as a criterion of organisational excellence (neither do civil servants as well as elected officials have legitimate roles to play as public innovators). According to Altshuler (1997), the reason is that, while government agencies face urgent problems, passionate claimants, and muckraking journalists, they experience little direct competition. Also, people in government fear nothing more than newsworthy failure.

Led by the third reason, it is relatively obvious that the corollary of minimisation of risks is the ability to foster innovation. However, public sector initiatives to innovate are limited because they are financed by taxpayer money and therefore subject to public scrutiny. While citizens demand a modernised government, they are generally ambivalent about innovation in the public sector, particularly because innovation often involves risk-taking that can lead to significant monetary losses (Teofilovic, 2002). This risk is simply as the uncertainty of outcome. The risk-related decision rule is to minimise the cost of uncertainty. According to Bhatta (2003), all risks can be dealt within any one (or

combination) of these ways: hedged, transferred, averted, or internalised; regardless of how they are dealt with, a deeper understanding of risks vis-à-vis innovation is contingent upon an understanding of their conceptual bases. Overall, risk aversion is a fundamental constraint on innovation in the public sector. Therefore, as said by Teofilovic (2002), strong leadership is a necessary imperative for establishing a cohesive, yet flexible, workplace culture that encourages idea experimentation and tolerates 'smart failures'.

The contemporary public service management agenda that has been emerging since the early years of the new Century seeks to challenge this ethos that the public sector is neither equipped to be, or should seek to become innovative (Matthews *et al*., 2009). Therefore, the dilemma whether the public sector should be more innovative or more stable is still open to debates, however existing literature focuses on promoting a more 'self-conscious' recognition of the importance of innovation in a public sector setting. Furthermore, the current crises as well as long-term trends support it. Rigid structures and a desire to resolve present and future complex problems with yesterday's solutions have made the majority of Western countries incapable of responding to systemic crises. Indeed, the ability to renew ensures the sustainability of society and power. The crisis and the world's shifting balance of power show that not only companies but also countries have stepped into the competition on the global market and battle for maintaining standards of living. It would be more accurate to say that a country's competitiveness is ensured by synergy of a good governance practice and an entrepreneurial clout.

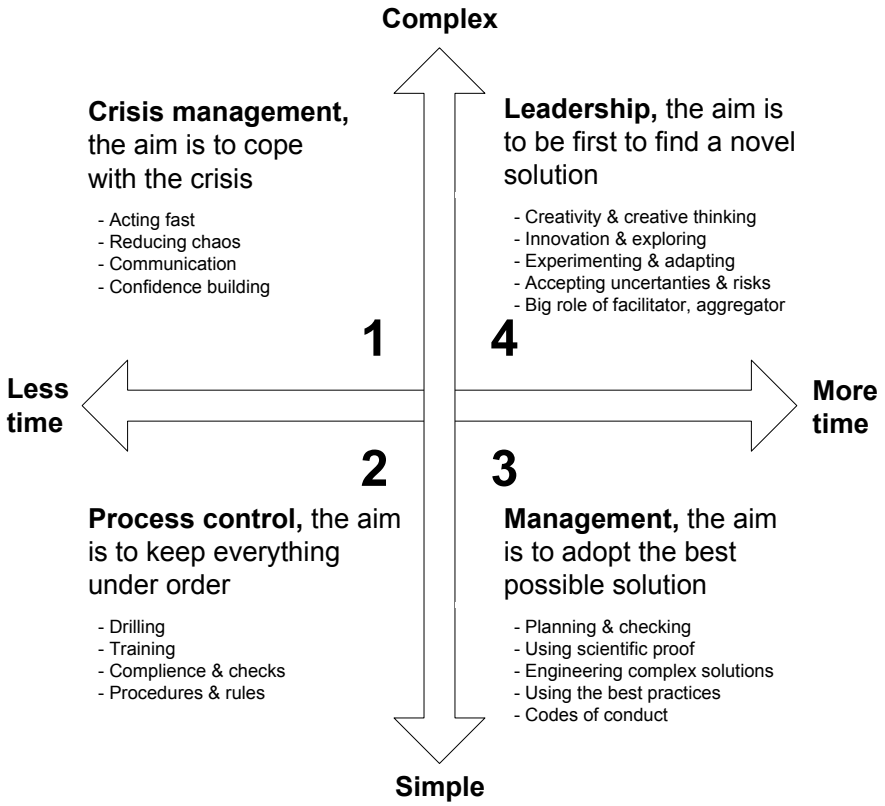
According to Mahbubani (2011a), it is believed that the lack of development and ensuing unemployment are as important as the lack of democracy why the recent revolutions broke out in North Africa and the Middle East. Yet, the countries in Asia have not had any revolutions, primarily because they are focused on economic development. To prevent instability the countries have to continuously promote good governance. As long as the common people in the country feel that with every passing year their livelihoods, the livelihoods of their children and governance are improving, there will be relative political stability.

There is also a difference between the Western and Asian narratives of governance. In the Western understanding, no good governance is possible without a set of political freedoms. In East Asia no good governance is possible without social and economic growth and development.

A good way to illustrate how governments should balance between order and creativity is the matrix developed by Lam (2011) that examines the ability of governments to respond to today's challenges, which tend to be increasingly complex.

Generally, there are two types of challenges in the world and at the level of countries and societies: simple (with some variables) and complex (with many variables). The first can usually be resolved with technical tools (a specific problem = a specific solution). Complex challenges are multifaceted, and they are often linked to values and are impossible to resolve with separate technical solutions (unspecific problem ≠ a specific solution), see figure 2.1. This model helps to determine the ability of any country or organisation to give an adequate response in different types of situations. The model has been compiled regarding challenges, but it can also be presented by opportunities.

Figure 2.1 Solution matrix for different types of challenges based on the complexity of the task and availability of time



Source: Lam (2011)

As we see, public management becomes more complex over time, therefore, as also stated by Bugge *et al.* (2010), innovation in the public sector may be motivated and influenced by a number of economic, industrial, political, relational and personal factors. Due to different major challenges, a shortage of statesmen who adequately understand specific policy themes and are able to mobilise societies to steer their countries towards new success is growing all over the world. As stated by Mahbubani (2011b), the constant shortage of leaders in the world who rule with "their head and heart", pinpoints the situation. A special emphasis is on the word 'leader' because in the majority of such cases the management of changes is required that relies upon providing inspiration for and building confidence in a large number of people. According to this logic, today's statesmen should match the following criteria:

- they have compassion, i.e. high morals and centred on higher objectives;

- they are wise and positively cunning;
- they are collectors of talent, i.e. they gather talents around them;
- they are innovative and have high I.Q. to understand complexity;
- they have the courage to make decisions and take responsibility.

Therefore, as one might conclude, innovation is also linked to culture. This 'innovation culture' is understood in terms of attitudes towards innovation, technology, exchange of knowledge, entrepreneurial activities, business, uncertainty (Hofstede, 2001), and related behaviour and historical trajectories. In his essay on the theoretical background that could be useful in enlightening the concept of innovation culture, Wieland (2004) conceives it as the institutions (norms, values, formal and informal) that have a significant influence on how the actors involved in an innovation process perceive economic and technical challenges and that provides them with strategies to tackle these. Indeed, Hofstede's model of national culture contained four dimensions (2001): power distance, individualism, masculinity, uncertainty avoidance, long-term orientation; with a fifth dimension added later: long-term versus short-term orientation. According to Cornford *et al.* (2006), existing evidence suggests that, while the potentials of ICT are available – at least to some degree – to every region, the ways and the effectiveness with which regions exploit these potentials vary hugely across the EU territory. Indeed, as most comparative work on cultures is based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states (Didero *et al.*, 2008), our proposition in the present research is to test whether the main characteristics and driving forces of the public service innovation system do or do not differ across different countries.

The critical point is that the obstacles to innovation in government are structural (often values-based) and not only the result of human incompetence or reluctance. As put by Kubr (1988: 311), "managerial attitudes and behaviour in public sector organisations constitute a key issue which consultants have to deal with in most assignments. It is very much a system problem, as managers tend to act in accordance with the written and unwritten behavioural rules proper to the public enterprise system. Thus, if risk taking is not encouraged, most of them will avoid it. If conformity is valued more than drive and originality, most managers will be conformists. Therefore, there are flaws in the system, these flaws inevitably affect managerial behaviour and efficiency at all levels."

Despite all the 'restrictions' described, the structures of governance in the public sector are changing. Traditional public service monopolies are being challenged by contestability, competition and

contracting out; old-fashioned, process oriented public administration is giving way to results-focused public management and the controls wielded by central departments are being devolved to the chief executives of line agencies (Shergold, 1997). Citizens are also demanding more personalised services, and there is a general pressure to accomplish more with less (Altshuler and Zegans, 1997, p. 68). Therefore, despite many services and institutions remaining non-innovative in public administration – the topic will become much hotter in years to come. More informed and quality-demanding citizens, growing budgetary pressure, global financial problems and related inflation, aging societies, health challenges, low-growth related long-term unemployment (especially among youth and people over 50), environmental and energy issues, pollution, water shortages, safety problems etc., leave few alternatives to governments than to be creative, to use modern technologies and to innovate in policies, services as well as in governance models, systems and networks.

Perhaps one of the largest challenges in public sector innovation research is to figure out where the main challenge (and so the largest opportunity) exactly lies. Are we talking about individual civil servants, organisational leadership and values, agency setup and regulations, or about something more wide and structural? According to Hämäläinen *et al.* (2011), governments should be strategically agile to respond to global challenges. Technological and demographic trends (and other megatrends, see for example Watson, 2008) and changes in the world economy transform societies and their operating environments. In order to adjust to these new techno-economic realities, the countries require social and institutional reorganisation, which by nature is far from easy. In this respect, governments typically overestimate their power to achieve permanent changes in the short term, and underestimate it in the long term.

The review above shows us that innovation in the public sector is clearly a growing topic, both for academic research as well as for policy-making practices. This is partly led by contemporary (and often permanent) challenges faced by governments around the globe, and partly by the fact that societies and economies are becoming more complex over time. This situation is similar for both more advanced developed economies and for developing parts of the world.

2.2. Differences between the public and private sector innovation

Despite acting similarly in many issues, one should be careful in applying theoretical understandings about innovation from the private sector directly to the public sector. Too many of the public sector innovation papers forcibly do so – the reason being a lack of data or lack of awareness. Nevertheless, these two wide sectors also have many things in common. Oracle (2003) has even called government the largest business in most countries as both the public and private sectors have employees in place to deliver products or services, both have customers that consume these products and services, both have a supply chain behind the delivery of products or services, and moreover both share a common objective in trying to reduce administrative overheads and improve core product/service delivery. Still, perhaps the largest difference between the public and private sector lies in the fundamentals of innovation. In the private sector, organisations that do not innovate effectively may be destroyed by those that do; this is not true in the public sector where organisations mostly lack the competitive pressure to innovate. In contrast, some studies have discovered that the public sector is even more innovative than the private sector. For example, when applying the Oslo Manual (OECD/Eurostat, 2005) methodology on measuring technological change to the Canadian public sector institutions, Statistics Canada discovered that the public sector was leading the private sector in technological change and it was supporting new technology acquisition (Earl, 2004). The study also suggests that public sector organisations are doing a much better job than private sector firms in training their employees to use new technology. Moreover, Koch and Hauknes (2005) also found no proof in their public sector innovation research substantiating the proposition that public sectors are less innovative than private sectors. They also found (during the interviews) that the public sector is less willing to take risk than the private sector. Among other things, they stressed the differences in management incentives and that public managers are in general more likely to receive lower and less performance based material benefits, which may influence their willingness to take risk.

There has been continued discussion over more than 100 years as to whether public services should be provided by public institutions, private institutions and/or charitable sectors. The preferences have been continuously changing. Moreover, there has never been an absolute distinction between the public sector and private sector, nor has a ‘pure’ public or ‘pure’ private sector ever existed (Vinten, 1992). Not all organisational forms fall easily into the two-fold classification of ‘fully private’ or ‘public:

without competition'. Rather, a continuum between these extremes can be posited (Tomkins, 1987). For example, private with part state ownership, joint private/public ventures, private regulated, public infrastructure/private operating, contracted out, public with 'managed competition', with considerable implications for how they may need to be differently managed

However, one of the typical concerns is (see for example Grout *et al.*, 2003) that publicly controlled organisations, not subject to the discipline of the competitive market, may lack incentives to control costs or provide quality of service and respond to the needs of consumers. In addition, they have a wide stakeholder base, and abstract social values and goals like safer streets, better public health and educational levels. Therefore, public organisations, perhaps more than private organisations, must deal with multiple stakeholders and potentially conflicting demands. How they balance the demands of multiple stakeholders will have consequences for their activities, outcomes, and the degree of trust in them by the public.

According to Hartley (2005, 2006), there is increasing recognition that the context has an impact, both directly on innovation determinants, processes and outcomes and indirectly through organisational features such as the amount of organisational resources and organisational strategy. One element of the context of complexity for public service organisations is that they are embedded in society, producing not only benefits (and obligations) for individuals as we see but also providing public goods and services, establishing collective efficiency, and creating collective rules and purposes, such as human rights, justice and freedom. Therefore, analysis of innovation needs to consider not just the immediate improvements in service quality (or introduction of new services) and fitness for purpose, but wider issues of public value.

The ways in which public agencies balance the needs and demands of stakeholders is a study in responsiveness (Bryer, 2006). The major differences between the public and private sector in environmental and dominant coalition factors are summarised in table 2.1.

Table 2.1 Differences of presumptions in public and private sector management decisions

Public sector	Private sector
Statutory and parliamentary regulation; codes and conduct	Board of directors; company planning frameworks
Multiple values and goals: service, public interest,	Relatively restricted (narrow)

equality, professionalism, consumer participation, complex trade-offs	
Primary social goals, e.g. safe streets, health, no user charge	Primary profit goals
Complex and debatable performance indicators	Mainly quantitative financial measures
Primary resource base from public taxes	Primary resource base from operational returns and borrowing
Relative openness of government and decision-making: stress on representatives	Relative secrecy: stress on business confidentiality
Attentive publics, wide stakeholder base; impact of subsidiary regulatory bodies	Primary focus on shareholders and management
Extensive accountability	Accountability restricted
Responsiveness to political masters and short political time-horizon	No real national/local politician overlay; less artificial time constraints
More ill-defined policy directives; complexity of policy implementation	Relatively less ambiguous policy
Needs for national economic management	Marketplace signals, e.g. business lending rate
Mostly long-term time horizon	Mainly short-term time horizon (except utilities, infrastructural services, etc.)

Source: Willcocks and Harrow (1992); Miles (2004)

Røste and Miles (2005) similarly argue that differences between private and public sector innovation are less distinct and more nuanced than simplistic views would imply. This is very relevant for measurement of the two sectors and the question whether completely different tools are required (Bugge *et al.*, 2010). In the private sector, success is ultimately measured in terms of increased revenue, increased profits, increased shareholder value or some combination of the three (Bason, 2010). Public organisations just do not have the competitive pressure to innovate, as well as no need and drive to earn and maximise profit. If adding here negative rewards for risk-taking, then it is obvious that creativity and innovation in the public sector are accidental happenings caused by some brave people. Bloch *et al.* (2009) also support the notion that unlike in the private sector, where innovation is fundamentally driven by profit maximisation motives, public sector innovation is concentrated with maximising societal welfare created through public investments. Value creation in the public sector is thus much broader in scope than for businesses (Kelly *et al.*, 2003). This means that innovation plays an essential (but also more complex) role in increasing the quality of public services (i.e. developing ways to address better societal problems to meet the needs of citizens and businesses) and raising the productivity of the public sector (i.e. increasing the effectiveness with which public monies are spent). An additional objective is creating trust and legitimacy of public sector institutions (Kelly *et al.*, 2003). Cole and Parson (2006) put it simply, emphasising the dual 'bottom-lines' of cost-

efficiency and outcomes. Inspired by the work on the UK National Audit Office (NAO, 2006), Bason (2010) proposes four types of value model for the public sector: productivity, service experience, results and democracy. The difficulty of the public sector or service organisations is that they have to create value in all four categories simultaneously, without destroying value on another. Cole and Parston (2006) therefore suggest that public organisations must view their production of value in terms of a 'balanced scorecard', where the challenge is to achieve positive value in all bottom-lines at the same time. This is an especially difficult task as some of the expectations of the general public, media, politicians or boards are often irrational and/or conflicting. It is also a specific problem for many governmental agencies, where management board members have to follow parallel policies coming from ministries, respective programmes, supervisory board directions, market developments, international competition between countries, etc. This makes the system rigid and slow to react, as well as always compromising and therefore not too decisive. This diminishes the overall effectiveness of policy delivery. We saw it everywhere in relation to the global financial crises – always too little and too late.

Alternatively, Hartley and Moore (2008) argue that there are five other inter-related characteristics distinguishing public sector innovations in governance from private sector product and process innovations. Innovations in governance: go beyond organisational boundaries to create network-based decision-making, financing, decision-making, and production systems; tap new pools of resources; exploit the government's capacity to shape private rights and responsibilities; redistribute the right to define and judge value; and should be evaluated in terms of the degree to which they promote justice and the development of a society as well as their efficiency and effectiveness in achieving collectively established goals.

Finally, the good news for public sector managers is that although the reasons are different, they are not alone in the pressure to create value and to innovate. As Prahalad and Ramaswamy (2003) stated long before the economic crises at the end on 2000s, competition in the private sector is intense and profit margins are shrinking – traditional prescriptions such as cost reduction, reengineering and outsourcing, while critically important, cannot solve the problem of margin pressure. The need to innovate is greater than ever.

This sub-chapter draw parallels between the public and the private sector innovation process. The literature review showed that differences between private and public sector innovation are less distinct and more nuanced than simplistic views would imply. Knowing all this, one should be very careful in bringing decades-long knowledge and theory of innovation developed from private sector studies (mainly of manufacturing industry) directly to the public sector. This also proves the necessity for comprehensive (and in many ways exploratory) studies to find out the deepest roots of innovative behaviour in public sector organisations.

2.3. Typology, characteristics and trends of innovation in the public sector

Typology is the study of types. As innovation in the public sector has several perspectives, types and characteristics, we hereafter analyse different streams of the literature from that perspective. The purpose of the literature review here is to bring together different streams of knowledge and theoretical understanding about public sector innovation. This is especially useful for the research design and questionnaire setup of the present exploratory research. Moreover, as comprehensive literature reviews about innovation in the public sector are rare, therefore, the current one also adds value from this respect. It also helps to test different statements coming from the literature throughout this thesis. The aim here is not so much to criticise, but more to synthesise together different theoretical understandings of public sector innovation.

Overall, there are only three arguments for bureaucratic[5] innovation, as stated quite radically by Altshuler (1997). Firstly, bureaucratic innovation is about means, not ends. Secondly, it is essential to the accomplishment of assigned missions and to the recovery of public confidence in government. Thirdly, the accountability–performance paradigm and being subject to adequate control by elected officials.

[5] The term bureaucracy is originally coined and defined Max Weber (1948). For clarifications: although most parts of the public sector may be considered as hierarchic and bureaucratic, so is most of the private sector, unless we consider worker cooperatives, and even these sometimes display bureaucratic tendencies (Vinten, 1992, p. 24). Moreover, even Weber did not make absolute claims for his theory – contrary to many interpretations, Weber did not maintain that bureaucratic organisations operate as efficiently as 'sole machines'. He said rather that such organisations operate more efficiently than any alternative system of administration and that they increase their efficiency to the extent that they 'depersonalise' the execution of official tasks (Bendix, 1966, p. 427).

Currey *et al.* (2008) define innovativeness in a public sector context as the quest for creative, unusual or novel solutions to problems and needs, including new services, new organisational forms and process improvements. Mulgan and Albury (2003: 3) put it simply – innovation equals 'new ideas that work'.[6] More precisely, the authors state that "successful innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes efficiency, effectiveness or quality" (Mulgan and Albury, 2003: 4). The latter is a common typology applicable to both the private sector and public sector differentiates three types of innovation (Baker, 2002), i.e. process (e.g. new internal procedures, policies and organisational forms); product/service (e.g. changes in features and design of services/products); and strategy/business-concept/policy (e.g. new mission, objectives, strategies and rationales). Based on their literature review, IDeA (2009) suggests adding two other types of innovation: delivery of public service (e.g. new or altered ways of delivering services or otherwise interaction with clients), and system integration (e.g. new or improved ways of interacting with other actors and knowledge bases, changes in governance). These innovations can be incremental, radical or systemic/transformational. According to Christensen and Lærgreid (2001), they might be 'sustaining' (improved performance along an established performance trajectory) or 'discontinuous' (disruptive).

Service innovations, according to Damanpour and Evan (1984), Kimberly and Evanisko (1981) and Normann (1991), are defined as new services offered by public organisations to meet an external user or market need: they are concerned with what is produced. Service innovations occur in the operating component and affect the technical system of an organisation and include the adoption of goods (which are material) and intangible services, which are often consumed at the point of production.

From the user perspective, three types of service innovation have been identified and tested (Osborne, 1998; Walker *et al.*, 2002). The first type is total innovations that involve providing new services to new users. Second, existing services provided to a new user group describes expansionary innovations. The third type is evolutionary innovations, which involve delivering a new service to existing users.

[6] The new ideas that work at creating public value can mean many different things – new ways of organising things (like public-private partnerships), new ways of rewarding people (like performance related pay) or new ways of communicating (like ministerial blogs) (Mulgan, 2007).

According to Walker (2008), one should also be aware of two types of organisational process innovations (Edquist *et al*., 2001): marketisation and organisation. Marketisation innovations involve modifying the organisation's operating processes and systems to increase the efficiency or effectiveness of producing and delivering its services to users (Schilling, 2005). Organisation innovations are innovations in structure, strategy, and administrative processes (Damanpour, 1987).

Walker (2008) adds that in public organisations, the requirement to meet multiple goals means that it is necessary to be innovative across a range of innovation types; focusing upon just one type of innovation is unlikely to result in the achievement of a number of, what are sometimes, conflicting objectives. These innovations are called 'ancillary' innovations by Damanpour (1987), and they are differentiated from other innovations because they are concerned with working across boundaries with other service providers, users, or other public agencies. Thus, their successful implementation is reliant upon others. Ancillary innovations are "organization-environment boundary innovations" (Damanpour 1987: 678).

There seem to be a broad consensus as to what innovation in the public sector means. Indeed, the understanding of it is relatively wide. The definitions may also vary depending on the author or precise topic under consideration – see for example Windrum (2008), and Howells and Tether (2004). The latter, for instance, distinguish physical services, information processing services, knowledge creating services, and people-oriented services.

These public service innovations should make governments more effective, efficient and citizen-friendly, or as stated by Kelly *et al.* (2002), there are three alternative forms of value creation in government: services, social outcomes and trust. According to McCormic (2003), innovations should lead governments and public sector institutions towards the following directions:

- Diversity and choice versus monopoly;
- Shared responsibility between policy-makers, service providers and citizens versus a culture of blame;
- Openness and confidence in the face of informed critique versus defensiveness;
- Early involvement of service users and providers in decision-making versus 'downstream' consultation on operational/delivery issues;
- Range of responses from the public: exit (contracting into private provision); voice (from deliberative public involvement to protest and litigation); and resignation (disaffection and falling expectations);

- Citizen and staff demands for feedback versus internally closed hierarchy;
- Technology as an enabler of timely and accurate service interaction versus fear, reluctant compliance or unrealistic expectations of what technology can achieve;
- Alignment of mainstream budgets to strategic objectives in the long term versus time-limited innovation at the systematic and geographical margins (pilots, challenge funds, area-based targeting, initiatives);
- Co-production of valued outcomes (e.g. health, learning, community, justice, quality of life) versus "manufacture" and delivery of services to the public dominated by inputs;
- Value-based policy and practice as well as evidence-based;
- Visioning as distinct from the 'delusion of predicting'; aspirations for how the next decade should unfold as distinct from forecasting.

Berry and Berry (1999, 2007) argue that diffusion of policy innovations is driven by learning, competition, public pressure or mandates from higher levels of authority. Their framework points towards the importance of competition, learning, vertical influence from oversight bodies and public pressure as positive forces leading to the adoption of innovations. This framework has been empirically tested, primarily with state policy data in the USA, though other national and international studies have been conducted (see, for example, Balla, 2001; Nicholson-Crotty, 2004; Weyland, 2004).

Indeed, the fundamental challenge in the public sector is that innovators usually succeed despite, not because of, dominant structures and systems. "Too many good ideas are frustrated, filed away, or simply forgotten," states Mulgan frankly (see Mulgan, 2007: 4).

Based on empirical work of Zegans (1997), who has questioned public managers in the U.S. about innovation, the following, somewhat surprising findings were discovered:

> *"What does it mean for them to innovate?"* Firstly, innovation is the process of implementing an idea, or enacting a technology, novel to a given situation; Secondly, successful innovation depends more on implementation skills and political savvy than on creative thinking; Thirdly, innovation is a tool for improving agency performance, not an end in itself; Fourthly, innovation is an intrinsic part of the public manager's job.
>
> *"What motivates the public managers to innovate*?" Managers described their principal motivation as putting useful ideas into action. They also cited funding crises, technical changes, and burgeoning demands for public services as important spurs to innovation. They did not

suggest that a personal need for creative expression or public credit for their ideas were important stimuli.

"The fundamental responsibilities of civil servants as innovators?" To produce and promote useful ideas; to inform political overseers about changes in the policy environment and flaws in policy assumptions revealed in the course of normal practice; and to routinely improve the operating performance of their organisations in a manner of consistent and current policy.

"Is discretion to innovate an asset or a liability?" – the managers argued that granting discretion to their employees is both necessary and desirable but that such discretion must be managed. When weighing the benefits to be obtained from intelligent grants of discretion to employees versus the risk of being held personally accountable for employee error, they consistently came down on the side of granting discretion. The managers saw it as their job to protect their employees from unfair attacks in the media and vindictive legislative enquiries.

From the questions above, we can draw out some generalised conclusions that, firstly, there is a lack of emphasis on creativity and originality (as an extreme form of innovation), and secondly, that the tension is more towards productivity-enhancing initiatives versus client/citizen satisfaction.

The following table 2.2 summarises different characteristics, drivers and impediments of innovation in the public sector drawn from the literature.

Table 2.2 Characteristics and management of innovation in public service organisations (PSOs)

Characteristics of successful innovations	The use of systems approach; the use of new technology; process improvement; the involvement of private/voluntary bodies in public services; the empowerment of citizens and PSO staff (Borins, 2001a; Osborne and Brown, 2005).
Where public sector innovation gets started	Bottom-up and top-down innovations (Baldock and Evers, 1991; Osborne and Brown, 2005). Needs-led innovations and efficiency-lead innovation (Halvorsen *et al.*, 2005)
What leads to innovation: stimuli, initiators, drivers and other 'triggers'	Political policy initiative; new organisational leadership; an organisational crisis; internal organisational problems; new opportunity for growth (Borins, 2001b). Innovators are primarily senior managers and politicians (Bartlett and Dibben, 2002). Support a culture of innovation from the top of it; increase rewards for innovation; establish an innovation fund to support innovative projects; encourage diversity inside the organisation, in order to engender differential perspectives on issues; use information effectively; value experimentation – and learn from it (Borins, 2001a; Osborne and Brown, 2005). Efficiency drives; new government priorities; other factors; response to crisis; change in ministerial priorities; new technology; work with peer organisations; change in policy environment; changes in resource use; implementing EU policies; change of function; private sector;

	direct action by citizens/campaigns; and spin-offs from other work (National Audit Office, 2006). Politicians; agency heads; middle management; frontline staff; interest groups; citizens; clients; others (Borins, 2006). Due to EU regulations; to ministerial or political suggestions; to senior staff suggestions; to middle and/or frontline staff suggestions; to customer suggestions; or due to other public sector organisations (The LSE Public Policy Group, 2008).
Innovation impediments	Barriers that arise from within the bureaucracy/organisation; obstacles that arise primarily in the political environment; barriers that exist in the external environment (Borins, 2001a; Osborne and Brown, 2005). Risk aversion, delivery pressures and administrative burdens (i.e. no time to think about innovation); poor risk management skills; short term horizons and budgets; reluctance to close down failing programmes or organisations,; constraining cultural or organisational arrangements; lack of incentives; and over-reliance on high performers as a source of innovation (Mulgan and Albury, 2003). Bureaucratic culture; risk aversion; entrenched practices and procedures; trouble/busy coping with large-scale reforms; lack of capacity for organisational learning (Clark *et al.*, 2008). Regulations and laws; funding; cooperation partners both internal and external; technology; union opposition; public opposition; concerns about loss of control and responsibility; opposition from private sector businesses; lack of clear vision or political support (Borins, 2006). Reluctance to new ways of working; stakeholders with different interests; getting the resources; fragmentation; coordinating stakeholders; lack of agreement on objectives; risks of audit; political uncertainty; lack of leaders; lack of training; working with contractors (National Audit Office, 2006).

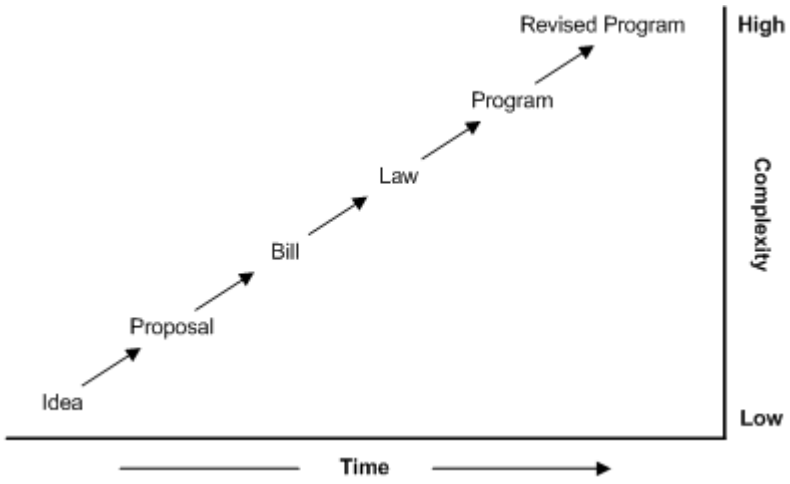
Source: Compiled by the author

From table 2.2 presented above, we see that there are clearly some similarities, but also many differences of organisational circumstances and external environment where public versus private sector innovation takes place. Perhaps one of the most important similarities between these two is that innovation is related to entrepreneurial thinking and some key individuals. It is known that analyses of public policy innovation span a wide-ranging set of policy issues, and identify multiple antecedents and consequences of those innovation policies (see for example Polsby, 1984; Kingdon, 1984; Schon, 1971). However, central to this research is the acknowledgement of a group of individuals who challenge the system, are irrationally committed to the inventions they championed, operated informally and subversively, exploited informal networks and mobilised outside pressures, engaged in life-long combat, and become heroes or martyrs to their cause (see Schon, 1971). Such individuals have been variously referred to as '(product) champion', 'guerrilla', 'public entrepreneur', 'revolutionary', and 'missionary' (Schon, 1963, 1971), as 'inventor', 'adapter', 'policy entrepreneur', 'broker', and 'incubator' (Polsby, 1984), or as 'advocate', 'broker', and 'policy entrepreneur' (Kingdon, 1984).

These individuals lead their ideas through a set of logically and institutionally required hurdles as illustrated in figure 2.2 (Roberts and King, 1989). These hurdles, which become increasingly complex, consist of idea generation, mobilisation of support, a proposal to and endorsement by power elite

(governor), the drafting of a legislative bill, the transformation of the bill into law, and the administration and revision of a programme in compliance with the new law. It is rightly said by Peter Drucker (1985), that entrepreneurs innovate. Innovation is the specific instrument of entrepreneurship. It is the art that endows resources with a new capacity to create wealth. Innovation indeed creates a resource. According to Bergek *et al.* (2005), entrepreneurial experimentation is also seen as one of the key functions of systems of innovation. However, the whole system is important. Howell *et al.* (2005) clearly point out that although innovation is contingent not only on individuals but also on a much wider range of factors such as organisational design, structures, cultures, working practices, etc., evidence does suggest that some individuals are more adept at introducing and supporting innovation.

Figure 2.2 Hurdles in public policy innovation



Source: Roberts and King (1989)

The term 'public entrepreneurship' was brought into wider discussion by Osborne and Gaebler (1992), who saw it as a device to 'reinvent government', to facilitate the complete transformation of bureaucratic government into entrepreneurial government. Entrepreneurial government is a government that is adaptable, responsive, efficient, and effective. In addition, it should not necessarily be a smaller government, but a better government. Such a government must be able to produce high quality goods

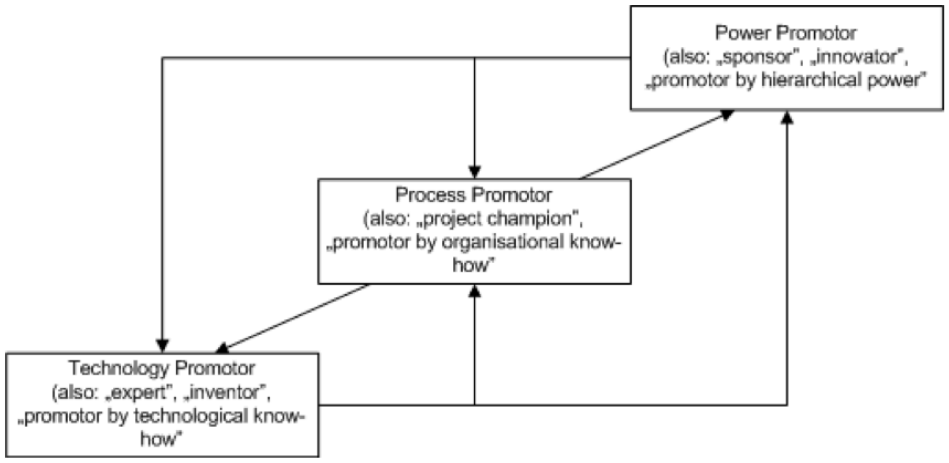
and services, be responsive to customers, be led by persuasion and incentives rather than command, empower clients, and – above all – be entrepreneurial (van Mierlo, 1996).[7] According to van Mierlo (1996) public entrepreneurship combines elements of classical market entrepreneurship and elements of modern social entrepreneurship of institutions of private initiative (a management strategy for non-profit institutions, see De Waal, 1991; De Waal *et al*., 1994). Client-orientation, professionalisation and productivity improvement are the key concepts by which the entrepreneurial bureaucrat in an entrepreneurial government can be characterised. Public entrepreneurship also imposes new challenges for bureaucrats operating between the political leadership of their bureau and the clients of the services provided by their bureau. Therefore, giving shape to entrepreneurship in bureaucratic organisations leads to an increasing demand for entrepreneurial, independent and innovative bureaucrats. Public entrepreneurship, however, also causes new problems of political-democratic control. To maintain the traditional values of public administration, e.g. accountability, efficiency and neutrality, Teofilovic (2002) suggests building an organisational strategy on three core principles: (1) partnerships; (2) empowerment; and (3) leadership. Within the frame of public entrepreneurship, it is also appropriate to use the distinction of Osborne and Brown (2005), who differentiate three following types of individual agencies needed for public sector innovation processes (which should both exist and be balanced):

- The *champion* of an innovation, at a variety of organisational levels;
- The *supporter* (usually a senior manager) of an innovation; and
- The *advocate* (usually a political or external stakeholder of an innovation).

From the theoretical perspective, the troika-model of teamwork for innovation (see figure 2.3), can illustrate this further.

[7] The whole programme for reform of federal government in the U.S. (led by Vice-President Al Gore from 1993) was inspired by the idea of 'entrepreneurial government' (see van Mierlo, 1996).

Figure 2.3 Troika-model of innovation promotors



Source: Hauschildt and Kirchmann (2001)

The model was built by Hauschildt and Kirchmann (2001) for the private sector, based on earlier work of Witte (1973) and Chakrabarti and Hauschildt (1989). The model helps to integrate strategic project level functions into the managerial context, widening the perspective of the project manager as a 'process promotor'. The promoter model was originally developed by Eberhard Witte in 1973, who was able to prove conclusively (based on his study of initial installations of computers in Germany) that innovations are only successful if energetic individuals give active support to the new product or process. Witte (1973) developed a two-fold dyad system, where the technology prompter (or promoter by know-how) has to contribute specific technical knowledge to the innovation process; specific knowledge must be employed against ignorance; innovators have to act as 'educators' or 'technologists' in order to win over reluctant colleagues or customers. On the other hand, the power promoter has to use hierarchical power to overcome the psychological barrier of unwillingness. Chakrabarti and Hauschildt (1989) claimed that in addition to the technology promotor and the power promotor, a third promotor is required for successful innovation processes. Problem complexity and system complexity (of organisations) demand a 'process promotor'. The process promotor has the task of overcoming further barriers, the barriers of non-responsibility and indifference, which are primarily caused by organisational and administrative resistance to the new idea. The process promotor derives his influence from organisational know-how. He knows who could be affected by the innovation. He

forges the link between the technology promotor and the power promotor. He is able to translate the language of innovative technology into the language traditionally spoken and understood in the firm. Therefore, he is the champion of innovation, able to turn an idea into a plan of action. The process promotor has diplomatic skills and knows how to approach and win over different types of people on a one-to-one basis. An empirical analysis by Hauschildt and Kirchmann (2001) shows also that the existence of promotors and division of labour between them has a positive effect upon the innovation process. They claim that out of all the promotor structures the Troika-model can support the innovation and information transfer process most successfully. This applies if one can identify specific individuals as the power promotor, process promotor and technology promotor respectively. In this way, the complex innovation work is split between several, mutually complementary, individuals.

Within a similar framework, interestingly enough, the National Audit Office (2009) study discovered that firstly senior management, then the policy team and only then equally importantly the internal innovation team and frontline staff were responsible for innovations. The earlier works of Borins (see Borins, 2001c), tell a slightly different story. Approximately 50 per cent of innovations originated from middle managers or frontline workers, 25 per cent from agency heads, 20 per cent from politicians, 15 per cent from interest groups, and 10 per cent from individuals outside government (these numbers total more than 100 per cent as respondents sometimes gave multiple answers). So in any case, the existence and importance of certain key individuals in innovative organisations is well proven. However, it is not yet clear how important they are in the public sector compared to other factors, especially if compared to political will and support, appropriate legal framework, and availability of financial resources, etc. Therefore, the present research will empirically assess the relative importance of these key individuals in the public sector innovation process.

Finally, these creative individuals and innovation needs a supporting organisational culture, which has in Rainey's words (Rainey, 1996) become one of the most widely discussed and reputedly important topics in management. However, it is also important to reiterate that although the need for cultural change can be easy to identify, it is much more difficult to implement such cultural change (Colville *et al.*, 1996). In public organisations, leaders face the constraints of complex administrative rules, political interventions and oversight, periodic turnover of elected officials, relatively short tenure in their own positions, and complex, conflicting goals. The external environment also consists of the legal

environment, which can act as a regulative (strategic control), directive or restrictive framework for public service organisations in their innovation development (see for example McKevitt, 1992). However, despite the different challenges, there are ways for managing change in the public sector (for closer discussions see for example Eadie, 1996; Mohr, 1999; Ingraham and Jones, 1999; Golembiewski, 1996).

A specific and increasingly important theme in the public sector innovation landscape is policy innovation. This is a complex process, weaving together multiple parties and interests, all of whom compete for a hearing and acceptance of their ideas on the government's decision agenda (see also Roberts and King, 1989). Policy innovation is an attempt to mobilise an innovation system – a set of ideas connecting people in multiple transactions, the thrust of which is to forge a new policy or procedure to guide public action. This system is embedded in an institutional context and environment that is constantly changing, providing new opportunities for some social actors, and setting up constraints for others. Authors suggest that we are now entering a 'third generation' of innovation policy (see European Commission, 2002), which has placed innovation at the heart of each policy area, it is a unique opportunity to deliver innovation-minded thinking across different governmental bodies and agencies. If one succeeds in delivering innovation thinking widely across government, and it is done correctly, the mission might have the widest effect ever on public sector innovativeness. However, as government affairs and governance systems become more complex then the importance of knowledge transfer and management in the innovation process also increases.

Therefore, an important element or factor of public policy innovation is also policy learning. Kinder (2002) stresses also the importance of the use of rigorous case study analysis as a means by which to advance public policy practice. Policy learning is not anything new; however, as said by Dolowitz and Marsh (2000), the technological advances have made it easier and faster for policy-makers to communicate with each other, and therefore the occurrences of policy transfer have increased. In their 1983 article "Thinking about Government Learning", Lloyd S. Etheredge and James Short (p. 41) asked the following questions: "Do governments ever learn from experience in the long run? If so, what are the processes? If not, what are the barriers? And what could be done to increase their learning rates?" In answering these questions, they distinguished five types of learning corresponding to different clusters of academic literature: scientific method learning; intuitive understanding (capacity);

creativity; skills to implement intentions; and capacity for good judgement and wisdom, for which the criteria for differentiated recognition and articulation, hierarchical interaction, and perspective (e.g. for appropriate selection among alternatives) can be applied. In addition to these individual learning types, they also distinguished two types of organisational learning: intelligence of top-level decision-makers, and collective individual coherence.

Making parallels to the private sector, then the concept 'open innovation' can inspire policy learning and innovation in the public sector. Osborne (1998b) has demonstrated that there is a need for an external orientation for the innovative public service organisation. In theoretical terms, it needs to be an open system rather than a closed system (Scott, 1992). The open innovation concept assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to markets, as the firms look to advance their technology (Chesbrough, 2003). The boundaries between a firm and its environment have become more permeable; innovations can easily transfer inward and outward. Besides acquiring external knowledge (typical to the innovation process), many firms have also begun to actively commercialise technology, for example, by means of out-licensing (see Lichtenthaler and Ernst, 2009). The central idea behind open innovation is that in a world where new knowledge is produced everywhere, and fast and widely distributed, companies cannot afford to rely entirely on their own research, but should instead buy or licence processes or inventions (e.g. patents) from other companies. In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures, spin-offs).

In today's policy learning context, Kemp and Weehuizen (2004) suggest to make a distinction between three types of policy learning: technical learning (about instruments), conceptual learning (about goals, strategies) and social learning (about societal values, responsibilities, appropriate ways of interacting, policy approaches). Governments borrow policies, institutional ideas and their setups, and other things, with the expectation that this transfer will lead to policy success rather than policy failure. However, policy transfer is not always successful. There is also a relationship between policy transfer and policy 'failure'. Dolowitz and Marsh (2000) suggest (based on their research) that there are at least three factors which have a significant effect on policy failure. First, the borrowing country may have insufficient information about the policy/institution and how it operates in the country from which it is transferred: a process called uninformed transfer. Second, although the transfer has occurred, crucial

elements that made the policy or institutional structure a success in the originating country may not be transferred, leading to failure: a process called incomplete transfer. Third, insufficient attention may be paid to the differences between economic, social, cultural, political and ideological contexts in the transferring and the borrowing country: a process called inappropriate transfer. In the framework of policy learning, it is appropriate to useful to distinguish four different kinds of knowledge (Johnson and Lundvall, 2001) – know how: the ability to do something; know what: knowledge about facts; know why: knowledge about principles and laws; and know who: knowledge about who knows what.

Furthermore, international organisations like the UN, OECD, EU, IMF, the World Bank and others have significantly boosted the phenomenon of policy learning. In addition, technology has made the transfer faster, wider and more comprehensive. As far as the present research is concerned, this external learning does not appear universally but often by disciplines – like technological, conceptual, institutional and policies.

To continue from a slightly different angle, then in parallel to public sector innovation and innovators, there is a thriving ascending community of social innovators emerging. In his speech exploring the future of civil society, its engagement and social enterprises, British Prime Minister David Cameron calls this phenomenon The Big Society (see Cameron, 2009).

The term social innovation is used to coin innovative activities and services that are motivated by the goal of meeting a social need and that are predominantly diffused through organisations whose primary purposes are social. A good example of that is the Big Issue, a socially innovative organisation which publishes The Big Issue magazine, and its international successor network of magazines sold by homeless people. The social entrepreneur is in this respect the father of the Big Issue, Mr. John Bird, who launched the enterprise in 1991. Other examples of social innovations include the Open University in the UK, Wikipedia, and the Grameen Bank (the pioneer of micro-credit for poor, rural people). According to Mulgan *et al.* (2008), there are three key dimensions illustrating social innovations. Firstly, they are usually new combinations or hybrids of existing elements, rather than being wholly new in themselves. Secondly, putting them into practice involves cutting across organisational, sectoral

or disciplinary boundaries.[8] Thirdly, they leave behind a compelling new social relationship between previously separate individuals and groups which matter greatly to the people involved, contribute to the diffusion and embedding of the innovation, and fuel a cumulative dynamic whereby each innovation opens up the possibility of further innovations. The public, private and voluntary sector are increasingly overlapping and therefore also innovation in these sectors (see, for example, Bekkers *et al.*, 2013, who have provided an integrative framework of relevant factors that influence the process of social innovation in the public sector). According to Mulgan *et al.*, the key growth sectors of the 21st century economy look set to be health, education and care, accounting between them for around 20-30 per cent of GDP, and more in some countries. "These are all mixed economies, strongly shaped by public policy, and requiring models of innovation very different from those that worked well for cars, microprocessors and biotechnology," states Mulgan *et al.* (2008: 7). This view is also supported by Stewart-Weeks (2008), according to whom there is a school of thought that suggests that over the next 20 years the things that will impact most on our ability as individuals, as communities and as a nation, to survive and prosper will not be economical but social. Our ability to fix some of the large, complex problems that impact us as people and communities – improving education and skills, preventing illness, and improving the productivity and quality of health care systems, eradicating poverty, improving opportunities for people with disabilities, designing and managing more liveable cities – will have the greatest impact on how well we live and how successful we can expect to be.

The end of this sub-chapter focuses on innovation awards as innovation motivators. William James (1920), the great Harvard psychologist and philosopher, made a poignant observation in a letter to his Radcliffe class in 1896: "I now perceive one immense omission in my Psychology. … The deepest

[8] Moore and Hartley (2013) have named them as a special class of innovations in the public sector, characterising them as 'innovations in governance'. These innovations differ from standard intra-organisational innovations in products, services, and production processes in at least two important senses. On the one hand, the innovations are conceived and implemented above the organisational level: they involve networks of organisations, or the transformation of complex social production systems rather than changes solely within a particular organisation. On the other hand, these innovations focus not only on concrete changes in what particular things are produced through what particular production processes, but also on the ways in which productive activity is financed (or more broadly, resourced), the processes that are used to decide what will be produced, and the normative standards used to evaluate the performance of the social production system. Four examples were given: contracting with community groups for Child Protection Services by The Massachusetts Department of Social Services, private partnerships to support New York City's parks, congestion charging in London, and elder care in Singapore.

principle of human nature is the craving to be appreciated. I left it out altogether from the book because I had never had it gratified till now" (p. 33).

According to Hale (1996), organisations with a goal not only on customers (citizens) and partners who are satisfied but also of employees who are enthusiastic about their jobs, often have an extensive employee recognition programme. The momentum of effectiveness is sustained by the talents and enthusiasm of employees and by management's recognition of their achievements and creativity. "As social scientists point out, recognition lies at the core of healthy self-esteem from child's earliest days," Hale says (p. 145).

A good and perhaps the largest exercise of awarding public sector innovations is the Program on Innovations in American Government, an on-going joint venture of the Ford Foundation and Harvard University's John F. Kennedy School of Government. The programme objectives are to identify valuable innovations at all levels of American government, to publicise them as sources of inspiration for other prospective innovators, and to develop curricular materials that may prove useful in training public officials to approach missions creatively. It includes both an annual competition and a programme of research. Each of the ten annual winners in the competition receives a cash grant of US$100,000 from the Ford Foundation, to be used for purposes of programme enhancement or dissemination. The intellectual agenda of the innovation programme has two main components: to pursue greater understanding of the dynamics of innovation in American government and to clarify thought about the place of innovation in the context of American public value (Altshuler and Zegans, 1997). The number of different awards has been rapidly increasing in the last decade (Borins, 2001c), however they do not recognise new but unproven ideas (Borins (2001d); they choose the best applications on the basis of results and replication as well as originality. Ideally, the winning applications will be relatively recent inventions that have been in operation long enough to show results and be replicated. Different types of public sector innovation awards include (a) departmental or government-wide achievement awards given to groups or individuals for a number of factors, one of which can be innovation; (b) innovation awards given by non-governmental organisations, such as the Ford Foundation/Kennedy School of Government and CAPAM awards; and (c) gain-sharing awards, such as financial awards (not necessarily large) given to groups or individuals for implementing cost-saving ideas or royalties given to public servants for inventions made while working for government.

Indeed, the challenge for public sector organisations is to go beyond individual innovations to create a climate supportive of on-going innovation on a large scale. “Perhaps the efforts of persistent individual innovators, coupled with some important systemic changes, will create a new reality”, states Borins (2001c: 319). As we see, among other factors influencing the innovation process in the public sector, different awards and recognitions of key players – initiators and executors – together with appropriate organisational changes have a very important effect for progress in the public sector. This is especially taking into account the previously discussed nature of the public sector, which is lacking competitive and/or profit driven pressure to innovate.

Finally, being innovative as an organisation is definitely a strategic issue. In her early study, Berry (1994a), while analysing the factors which lead a state agency (in the U.S.) to adopt strategic planning as an innovation in public management, developed four explanations for that: its resources, its leadership style, its orientation to business and citizens, and diffusion of strategic planning across states. Her research found that agencies are most likely to adopt strategic planning: (1) early in gubernatorial administrations, (2) under conditions of strong fiscal health, (3) when agencies work closely with private sector businesses, and (4) as the neighbouring state agencies that have already adopted strategic planning increases. Linking it to policy learning, then her review of an extensive literature on the determinants of state policy innovation (Berry, 1994b) reveals that there are three principal types of explanations for what causes a state government to adopt a new policy: (1) the internal determinants model claims that the primary factors leading a state to innovate are characteristics internal to the state. The other two are diffusion models – regional diffusion, and national interaction – that regard state adoptions of policy as emulations of previous adoptions by other states. Her simulation analysis showed that using single-explanation methodologies on these three explanations frequently produce results that are wrong, and the danger is not ‘false negatives’ but ‘false positives’. The results showed a tendency for single-explanation methodologies to detect the presence of both internal determinants and national interaction when neither is present and when, instead, policy adoptions follow a purely regional diffusion pattern. Similarly, policies that do not diffuse and the adoptions of which are determined strictly by internal determinants indicate the presence of regional diffusion when subjected to a single-explanation test.

This literature review section analysed the typology, characteristics and trends of public sector

innovation. It showed also that there is relatively wide and scattered understanding of innovation in the public sector, however with some exceptions, it is lacking empirically grounded evidence of the nature and details of the public sector innovation process. The following sub-chapter opens up other government modernisations and transformation initiatives often not directly covered by the innovation literature.

2.4. Other progress, modernisation and transformation waves in the public sector

There have been other government modernisation and transformation initiatives and eras around the globe over time other than what we call 'the innovation story'. For some countries, government reform and innovation involves the reform of an old bureaucracy in the context of a newly democratic state. For other countries, this entails an all out fight against corruption. For still other countries, the challenge is to modernise large, outmoded bureaucracies and bring them into the information age. While countries have come to government reform for very different reasons, government reform and innovation is a global phenomenon today. In some countries this movement has been called reinventing government; in other countries it is referred to as building state capacity or modernisation of the state; and in still other countries this is named New Public Management (NPM), or even a post-NPM regime in some countries. Moreover, in developing countries, government reform movements have often resulted from severe economic crises, corruption, or as the result of conditions imposed by international lending organisations or other global communities (such as the European Union). Another dimension in government transformation is related to e-government, more recently also mobile-government. The analysis of innovation through e-government will be started in this sub-chapter and followed more deeply in sub-chapter 4.4.

An important point to mention is also that the convergence of reform strategies has meant that concepts have spread from one country to another (partly via previously discussed policy learning), often without even changing the terminology (see Kamarck, 2003). There are also several modern trends related to the public sector (see for example OECD, 2004b; IDeA, 2009); some of them are the following:

- Organisational structure, e.g. agencification, 'distributed governance'[9];
- Partnerships, e.g. PPPs, regional/local, voluntary sector involvement;
- Horizontal integration, e.g. breaking down departmental 'silos' and fostering cross-departmental co-operation and co-ordination;
- Good fiscal management, e.g. budget reform, containment of deficits;
- Performance-based management and budgeting, e.g. top down/systems versus bottom up/ad hoc approach;
- Public service revitalisation, e.g. building/strengthening capacity at national/regional/local levels;
- Devolution and decentralisation, e.g. devolution of power from central to regional/local government and other agencies;
- Service improvement, e.g. provision of 'personalised', client-centred services;
- Systems and process improvements, e.g. streamlining business processes, developing customer-centric systems;
- Regulatory change, e.g. focus on deregulation and simplification, shift from enforcement towards voluntary compliance;
- Use of IT for both front and back office operations, e.g. providing on-line, 'e-enabled' services, investing in customer relationship management and service-oriented architecture technology.

The question of why public management reform is answered in three ways (OECD, 2000). First, governments need to keep up with society. The purpose of reform in this respect is to make governments more responsive to society's needs and demands. Public management is being reformed in order to provide better, faster and more services. However, quality, quantity and speed are not the only new competences that society requests from its government. Since the pace of societal change is accelerating, government should equally be able to respond to changing demands with new solutions (including technological). Secondly, government needs to be reformed with the purpose of re-establishing trust in government. Government needs to provide more choice, democracy and transparency. Therefore, the public services need to work with the political sphere. Equally important is strengthened communication and connection with citizens. Finally, governments need to be reformed due to new pressures and global challenges. Outside forces place competitive, but also existential pressure on government for serving the public, as well as securing economic stability and sustainability. In addition, greater economic interdependence, the opening up of societies and the growing importance of international structures and agreements, make outside pressures more complex and multi-dimensional. Hence, the environment in which and for which government operates presents

[9] According to OECD (2004b) estimates, in 2004 such arm's length bodies in central government accounted for between 50 and 75 per cent of public expenditure and employment in many OECD countries.

new demands. Reform then is the process of preparing or adapting government to its new role in a changing society (Dooren *et al*., 2004).

Yet from the theoretical side, Brunsson and Olsen (1993) characterise reform as a rationalistic effort at organisational change, which is mainly true in the private sector. In the public sector, reforms might originate also from other, external consequences. When reviewing the literature on reform theories, Peters (1994) identified three useful categories of reform models that can assist in the interpretation of recent reforms installed in the developed world. The first set of models is 'purposive', the second set is 'environmental dependency models' and the third 'institutional models' (see table 2.3 for a brief elaboration). The application of Peters' typology helps make sense of reform assessments (especially related to New Public Management, elaborated later in this chapter).

Table 2.3 Peters' categories of reform models

Purposive Models	▪ Leaders identify need for change, type of reform, direct implementation. ▪ Reforms are endogenous in objective and guidance. ▪ Reforms are guided by either implicit or explicit theory, commonly managerialism and/or economic theory of individual incentives. ▪ Reforms reflect rational analyses with optimised solutions.
Environmental Dependency Models	▪ Organisational change or reform constitutes adaptation to environmental factors by: - exploiting economic or technological innovations in the environment; - structures coming to reflect environmentally imposed tasks; - finding niches where they can survive. ▪ Historical efficiency is at work in the adaptive process.
Institutional Models	▪ Organisations are collectives that reflect history, shared values, norms and roles. ▪ Change requires alternative internal organisational values and, therefore, members' operative values. ▪ Organisational mutability is constrained by constitutive beliefs, relationships, and process. ▪ Outcomes of reform are unpredictable. ▪ Reform leads to unintended consequences.

Source: Adapted by author from Peters (1994) and Skelley (2002)

Hale (1996) brings in the term of high-performance public organisations. According to him, an attempt to define a high-performance organisation might take the following stance: it is a high-performance organisation when:

- Anyone in the place can set out the organisation's mission and values;

- It is always looking into something new;
- Its customers' stratification level is high;
- A 'failure' is considered a learning experience;
- Its employees frequently work in teams;
- The leader is a partner to the staff members;
- Others study and write about it, and everyone wants to take credit for its accomplishments;
- It can give relevant information on its programme results;
- It is a laboratory and its own best model.

The U.S. National Academy of Public Administration (NAPA) Alliance for Redesigning Government has provided future testimony of characteristics of high performance work organisations:

- They are clear in their mission;
- They define outcomes and focus on results;
- They empower their employees;
- They institute new processes in order to motivate and inspire people to succeed;
- They are flexible, adaptable, and quick to adjust when conditions change;
- They are competitive in terms of performance;
- They restructure their work processes to meet customer needs;
- They maintain open and productive communication among stakeholders.

According to earlier work of Minnesota's STEP (Service Towards Excellence in Performance) high performance is based on the six 'hypotheses':

- Closer contact with the customer will provide a better understanding of the customer's need;
- Increased employee participation taps the knowledge, skills and commitment of all state workers;
- Increased discretionary authority gives managers and employers greater control over and accountability for a bottom line;
- Partnership allows the sharing of knowledge, expertise and other resources;
- State-of-the-art productivity improvement techniques will enhance productivity;
- Improved work measurement provides a base for planning and implementing service improvements and giving workers information about their performance.

A comparison of these three lists reveals a common pattern that affirms two fundamental approaches to high performance in the public sector: orientation toward a mission and the customer and empowerment of employees. In addition, a high performing organisation embraces teamwork, employee participation, flexible management, and rewards and recognises a nurturing-community culture.

The New Public Management (NPM) movement (in the U.S. called 'government reinvention' movement) started in the UK after the so-called Thatcherism period, when public officials were considered inefficient and ineffective, and the perceived problems were answered with the privatisation

and marketisation of public services (Ascher, 1987). The critique of this era stated that it was concerned more with economic and cost cutting than with effective service provision and that it assumed the superiority of the private sector and private sector management techniques above those of the public sector and public administration (Metcalfe, 1989). This debate become most focused in the 1990s and was characterised as the New Public Management (Osborne *et al*., 2002). The approach criticised bureaucracy as the organising principle within public administration (Dunleavy, 1991); a concern was the ability of public administration to secure the economic, efficient and effective provision of public services (Hughes, 1997). The core of the NPM framework was hands-on and entrepreneurial management; standards and performance measures; disaggregation and decentralisation; competition; private sector styles of management; and the discipline and parsimony of resource allocation. Rather, the planning, management and provision of the public services was seen as something to be negotiated between a number of actors, including government, the voluntary and community sector and the private sector (Osborne *et al*., 2002). In this model, the key task of government becomes the management of these complex networks of public service provision (Rhodes, 1996; Kickert *et al*., 1997). 'Steering rather than rowing' become the famous stereotype for this process.

The new public management agenda has challenged the traditional public administration model understood as a Weberian ideal of bureaucracy, where, according to Jørgensen (2010), some of the fundamental principles of traditional public administration found that governments should organise themselves according to the hierarchical principles based on strict predefined procedures. According to Hood (1991), the classic formulation of NPM holds that it comprises eight doctrines:

(1) a focus on hands-on and entrepreneurial management, as opposed to the traditional bureaucratic focus of public administration (Clarke *et al.*, 1993);
(2) explicit standards and measures of performance (Osborne *et al.*, 1995);
(3) an emphasis on output controls (Boyne, 1999);
(4) the importance of the disaggregation and decentralisation of public services (Pollitt *et al.*, 1998);
(5) a shift to the promotion of competition in the provision of public services (Walsh, 1995);
(6) a stress on private sector styles of management and their superiority (Willcocks and Harrow, 1992);
(7) the promotion of discipline and parsimony in resource allocation (Metcalfe *et al.*, 1990);
(8) separation of political decision-making from the direct management of public services (Stewart, 1996).

By now, most of OECD countries have been actively reforming their public sectors for two decades. Initially the problem seemed to be a relatively straightforward one of improving efficiency, reforming management practices, and divesting public involvement in commercial enterprises. While more efficient government is certainly desirable, efficiency alone is not a guarantee of better government. A concern for efficiency is being supplanted by problems of governance, strategy, risk management, ability to adopt change, collaborative action and the need to understand the impact of policies on society (OECD, 2003a). Moreover, the 'reinventing government' movement of the 1990s was supposed to slingshot the public sector into the twenty-first century. However, that movement focused mostly on reforming individual bureaus and agencies. Some limbs of the government become lithe and supple. Others started pushing for results, rather than simply trying to beef up their budgets. Ultimately, government as a whole remained creaky, old-fashioned, and disconnected. "Even reformed bureaus do not always play well with others," states Eggers (2005: 2). Government made very little progress at working better, smarter, and more efficient across agencies and levels of government, despite the fact that almost everything government does today involves multiple agencies, multiple levels of government, and the business sector and civil society.[10] As is noted by Stauffacher (2002), there have been many labels, for example 'reinvention', 'redesign', 'public sector reform', 'the new public sector management', and 'managerialism', nevertheless, whatever the label, a process of profound public sector restructuring is sweeping the developed world.

According to Dunleavy *et al.* (2005), although its effects are still working through in countries new to New Public Management (NPM), this wave has now largely stalled or been reversed in some 'leading edge' countries. This ebbing away chiefly reflects the cumulation of adverse indirect effects on citizens' capacities for solving social problems, and because NPM has radically increased institutional and policy complexity. The character of the post-NPM regime is currently being formed. The present status of different directions of NPM (disaggregation, competition and incentivisation) can be followed on table 2.4.

Table 2.4 The key components of NPM and their current status (in 'leading edge' countries)

[10] In the United States, 90 cents of every federal dollar goes to either individuals in the form of entitlements or to state and local governments and private or non-profit contractors as grants and contracts. See Kettl (2000).

Theme	Component	Current status
Disaggregation	Purchaser-provider separation	X
	Agencification	X
	Decoupling policy systems	X
	Growth of quasi-government agencies	X
	Separation out of micro-local agencies	X
	Chunking up privatised industries	X
	Corporatisation and strong single organisation management	X
	De-professionalisation	X
	Competition by comparison	~
	Improved performance measurement	√
	League tables of agency performance	√
Competition	Quasi-markets	X
	Voucher schemes	X
	Outsourcing	~
	Compulsory market testing	~
	Intra-government contracting	~
	Public/private sectoral polarisation	~
	Product market liberalisation	~
	Deregulation	~
	Consumer-tagged financing	√
	User control	√
Incentivisation	Re-specifying property rights	X
	'Light touch' regulation	X
	Capital market involvement in projects	X
	Privatising asset ownership	~
	Anti-rent-seeking measures	~
	De-privileging professions	~
	Performance-related pay	~
	PFI (private finance initiative)	~
	Public-private partnership	~
	Unified rate of return and discounting	√
	Development of charging technologies	√
	Valuing public sector equity	√
	Mandatory efficiency dividends	√

Source: Dunleavy et al. (2005)

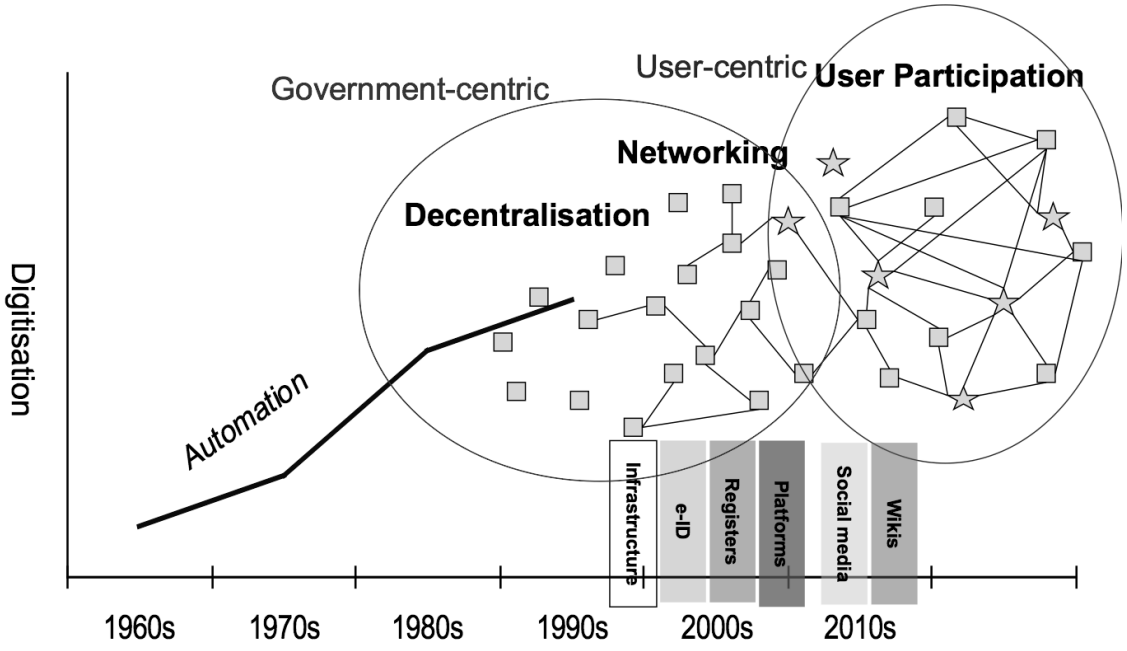
Notes: (X) Trend has been wholly or partly reversed. In some cases the change has been linked to policy mistakes or disasters and has been rolled back. (~) Trend has substantially stalled. Even advocates no longer expect it to engender significant improvements in government effectiveness. (√) trend is still spreading and its usefulness has not been seriously questioned.

The overall movement towards the post-NPM incorporates the new shifts towards 'digital-era governance' (DGE; see the next section), which might offer a unique opportunity to create self-sustaining change, in a broad range of closely connected technological, organisational, cultural and social effects (Dunleavy *et al.*, 2005).

Early post-NPM advancement ideas can also be found from the U.S. Department of Labour report (1996) 'Working Together for Public Services: Report of the U.S. Secretary of Labour's Task Force on Excellence in State and Local Government Through Labour-Management Cooperation.' The report states that there is clearly need for a change from more traditional ways of planning and delivering services and the traditional roles of labour and management. Indeed, the NPM movement led governments to secure the economic, efficient and effective provision of public services, as well as hands-on and private sector styles entrepreneurial management together with performance measures. Due to that, governments moved closer to private sector also in terms of innovativeness. However, innovative activities in government remained chaotic; improvements were focused more on cost cutting than well-targeted investments into quality improvements, system improvements and citizen centric services.

During the last decade or so, public sector innovation has been in many ways led by the e-government phenomenon. In the beginning it was more infrastructure-driven and government-centric development (see figure 2.4), but as time went by it become more user-centric. This means that networking and user participation becomes more important, as well as systems more complex yet standardised. More recently, according to the OECD (2010), there have been the following drivers for this kind of e-innovations: financial, economic and social crisis; economic recovery and fiscal sustainability, strengthening core values in the public sector (efficiency, fairness, equity); ICT as an enabler and driver for public sector and service innovation; and strong political and managerial leadership – achieving long-term sustainability. Another perspective to look at value of this e-led transformation is maximised efficiency and effectiveness, achieved coherent and transparent government, and strengthened trust in government through integrity, transparency, accountability, responsiveness and inclusiveness. From the user perspective, this has led to the simplification of service organisation, service integration, cultural harmonisation among service providers and users, and general awareness raising both within government and externally.

Figure 2.4 E-Government-driven innovation



Source: OECD (2010)

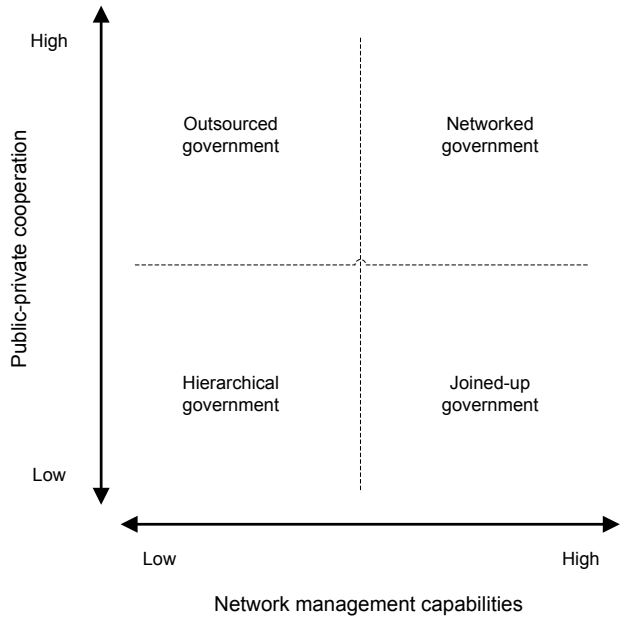
Therefore, technological advancements, especially ICT and the Internet have led to the rise of digital-era and networked governance. However, the challenge for today's governments comes from their struggle to use twentieth-century tools to cope with twenty-first-century problems with nineteenth-century governance structures. According to Kettl (2001), people have pursued good management through authority and hierarchy for a century, and when new challenges emerged, they responded by reorganising and strengthening the bureaucracy. However, today's problems tend not to fit into the bureaucratic orthodoxy.

The digitalisation process of government is perhaps a once-in-the-lifetime opportunity to rethink how the public sector works, how it is managed, how it is built up, how clients and citizens see it, and how back-office functions are structured and run. Instead of electronic channels being seen as supplementary to conventional administrative and business processes, they become genuinely transformative, moving towards the situation where the agency 'becomes its website'. Therefore, creativity in rethinking the government should be encouraged in all levels. However, it is challenging to both political leaders, as well as agency managers to manage and run this type of by definition

relatively chaotic, networked form of government. Moreover, authors (see Longford, 2002: 17) also stress that "e-government 'boosters' tend to overstate the transformative capacity of information technology and to underestimate the numerous obstacles to enhancing the quality and participatory nature of democracy, including endemic structural features of the political system, entrenched habits of government secrecy and hostility to access to information laws, the effects of neo-liberal public policy and public sector restructuring, and the recalcitrant, multiple inequalities cross-cutting the social fabric of a particular country."

According to Goldsmith *et al.* (2004), the bureaucratic government can be upgraded by introducing so-called 'networked government'. Thanks to a variety of factors, including advances in technology and the broader changes in the economy and society that favour networked forms of organisation, today's networked government (see figure 2.5) trend is both greater in breadth and different in kind than anything seen previously. The author emphasises that the main elements or characteristics of network management are the following: big-picture thinking; coaching; mediation; negotiation; risk analysis; contract management; ability to tackle unconventional problems; strategic thinking; interpersonal communications; project and business management; and team building.

Figure 2.5 Models of government



Source: Goldsmith et al. (2004)

According to Sørensen and Torfing (2005), governance networks have become a necessary ingredient in the production of efficient public governance in our complex, fragmented and multi-layered societies and the big question has become the extent to which governance networks also contribute to democratic decision-making. They also claim that: "Governance networks that take active part in determining the content of public policy making have traditionally been regarded as a threat to democracy on the grounds that they undermine the sovereign position of elected politicians and the autonomy of civil society; however, the liberal democratic model of parliamentary democracy no longer provides an adequate understanding of what democracy is and how it can be properly institutionalized" (p. 197).

Governance by network presents the confluence of four influential trends that are altering the shape of public sectors worldwide (Goldsmith *et al*., 2004).

(1) *Third-party government:* the decades-long increase in using private firms and non-profit organisations – as opposed to government employees – to deliver services and fulfil policy goals.
(2) *Joined-up government:* the increasing tendency for multiple government agencies, sometimes even at multiple levels of government, to join together to provide integrated services.

(3) *The digital revolution:* the recent technological advances that enable organisations to collaborate in real time with external partners in ways previously not possible.
(4) *Consumer demand:* increased citizen demand for more control over their government services, to match the customised service provision technology has spawned in the private sector.

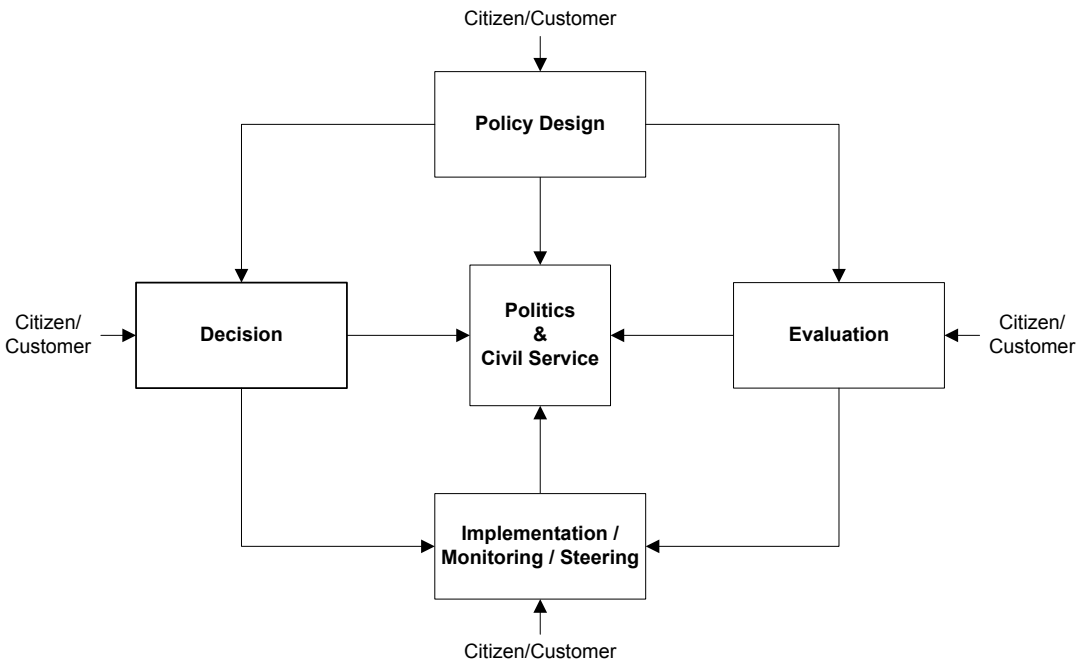
Governing by network represents the synthesis of these four trends, combining the high level of public-private collaboration characteristics of third-party government with the robust network management capabilities of joined-up government, and then using technology to connect the network together and give citizens more choices in service delivery options. Michael E. Porter (2004) has pointed out that government alone cannot address society's most pressing challenges. Instead, new kinds of collaborations are needed, with the private sector and social enterprises playing central role. There is currently an ongoing process of rewriting the roles of public management.

Moreover, as government relies more and more on third parties to deliver services, its performance depends ever more on its ability to manage partnerships and to hold its partners accountable (Kettl, 2002), however, as stated by Donahue (1990), governing by network is hard – there are countless ways it can go wrong. One large obstacle is that government's organisational, management, and personnel systems were designed to operate within a hierarchical, not a networked, model of government, and the two approaches often clash.

An opportunity to overcome this clash might be to take a client viewpoint. Therefore, the voice of the client or consumer point of view, according to Pollitt *et al.* (1995), has been gradually given an organisational home with the system, sometimes also called citizen/customer centrist reforms. In this respect, the public sector has taken a more responsive form in order to cope with the external environment. As the OECD has argued, coping with 'responsiveness' will require a new administrative style public management (OECD, 2005). According to Jørgensen (2010), this implies that the public sector to a larger degree has started to deal with outside groups to improve responsiveness, which was not the case in the traditional administrative model. The new approach allows and requires interaction with other groups both to obtain better results and enhance accountability, but also for wider engagement and ownership building. This can be done by introducing customer surveys, focus groups, and foresight-type of thinking, new ways of gathering information on the users exist, which at the same time also allow the processes to be run directly by administrators, etc.

According to the OECD, the dynamic way of getting citizens/customers of public services involved in order to enhance their perceptions, expectations and commitment through active participation has been a common strategy to obtain a legitimate level of quality and satisfaction of public services (see OECD, 2001a). Thus, where the traditional relationships were bureaucratic and hierarchical the new relationships are instead more pluralistic (Peters and Savoie, 2000). This changing role of citizens/customers of public service has an impact on whole of the policy and management cycle. Traditionally, the policy and management cycle is dominated and controlled by politicians and administrators. However, as is illustrated also in figure 2.6, citizens/customers are more and more involved in this policy and management cycle at different stages (design, decision, implementation and monitoring, and evaluation). Citizens/customers become co-designers, co-deciders, co-producers and co-evaluators (Dooren *et al*., 2004). This continued consultancy is defined by the OECD as a two-way relationship in which government talks to citizens and citizens provide feedback to government (OECD, 2001a).

Figure 2.6 Active involvement of citizen/customer



Source: Dooren et al. (2004)

Maintaining an open, learning policy system in a society or a world of enormous diversity requires techniques that are engaging; efficient in their use of citizens' limited time and varied expertise; and able to handle complex, multilayered problems (Redburn, and Buss, 2004). Governments are using different tools to seek feedback on policy issues (e.g. opinion polls and surveys) or on draft policies and laws (e.g. comments and notice periods) from a broad range of citizens. They may also use tools of consultancy providing greater levels of interaction with smaller groups of citizens (e.g. public hearings, focus groups, citizen panels, workshops). Enabling citizens in policy deliberation and active participation requires specific tools to facilitate learning, debate and drafting of concrete proposals (e.g. citizen's forums, consensus conferences, citizens' juries) (OECD, 2001c). Moreover, technology has also created different opportunities for this, i.e. e-democracy solutions, making a dialogue between government and its citizens simultaneous and seamless.

Therefore, the ability of a government organisation to solve controversial and complex problems depends both on its willingness to involve the public and on its ability to conduct a public participation process. While willingness to involve citizens may flow largely from local political conditions and climates, the skills necessary to conduct effective public participation process may be purposefully – and relatively easily – developed. Principal among these skills are leadership, facilitation, problem solving, and conflict management (Parr and Lampe, 1996). The type of leadership needed for effective collaboration – as distinct from charismatic or hierarchical leadership – requires competence across organisations, agencies, sectors, and sometimes cultures. In other words, successful collaborators must be able to convene people from very different backgrounds and help them work towards results despite their divergent values (Chrislip *et al.*, 1994).

The relative openness of governing institutions to citizen involvement may be located along a three-stage continuum, with each stage defined by a set of conditions, characteristic, and elements, as summarised in table 2.5.

Table 2.5 Relative openness of governing institutions to citizen involvement

Stage I Closed System	Stage II Uncertain System	Stage III Open System
One strong political party philosophy	Multiple influential political parties	Progressive, cooperative politicians
Weak or insecure leadership	Leadership struggles	Open and shared leadership
Secretive bureaucracy	Self-centred bureaucracy	Progressive, quality-oriented bureaucracy
Influential, fractious special interest groups	Alliances of interests	Community cooperation
Powerful, intrusive media	Not fully competent media	Competent, involved media
Unorganised citizens	Some citizen groups, but little coherence	Active, effective citizen groups
Poor information systems	Lax information systems	Freely collected and shared information
Strong, inflexible unions	Little or no labour organisations	Strong, cooperative unions

Source: Bens (1994).

Therefore, as public organisations must deal with multiple stakeholders and potentially conflicting demands, stakeholder expectation management is perhaps one of the largest challenges for public sector leaders. In this respect, a stakeholder definition should be wider than coined by Freeman (1984: 46) – "Any group or individual, who can affect or is affected by the achievement of the organisation's objective." In the public sector a stakeholder can be anybody who might have something to say about the activities, performance or any aspect of the organisation. These, sometimes irrational expectations and public statements (amplified often by media) can recognise, but more often punish (sometimes unfairly) both public organisations and their managements.

Finally, as Sørensen and Torfing have long studied governance networks (see: 2005, 2010, 2011) they claim that there are three generations of governance network research. The first generation emphasised the contribution of networks to effective policy-making (Provan and Milward, 1995; Rhodes, 1997; Scharpf, 1999). Governance networks facilitate the exchange and pooling of resources, coordination of policy initiatives and development of joint policy solutions. The second generation of research has focused on the role of governance networks for democratising public policy making by enhancing empowered participation, democratic deliberation and democratic ownership (Benz and Papadopoulos, 2006; Klijn and Skelcher, 2007; Warren, 2009). Although governance networks sometimes suffer from illegitimate exclusions and a lack of accountability, they may help to enhance the input and output

legitimacy of public governance. A new third generation of research is currently emerging. According to Sørensen and Torfing (2010), it aims to investigate the innovative capacities of governance networks and explore when, how and why governance networks can contribute to innovation in the public sector (Hartley, 2005; Considine *et al.*, 2009; Eggers and Singh, 2009).

This literature review sub-chapter analysed the broad spectrum of modernisation waves in the public sector often not directly covered by the innovation literature. It showed that reform in government is a continued and relatively natural process, helping governments to keep up with society and to face local, regional and global challenges. An important aspect is speed, quality and impact of needed change, which can be sometimes linked to adoption of new solutions and technologies that requires knowing up-to-date modern trends, as well as being well networked and ready to learn and risk.

However, even if change and continued self-reform and learning is part of some public administrations, one should know more precisely (with empirical proof) what are the factors supporting and hampering this innovation process in government to be spread more widely. Moreover, different reform initiatives are too much 'agency-focused' and lacking the overall picture of how really to deliver significantly better performance at significantly lower costs. More radical and systemic changes are needed for that and it should be better understood how the innovation system(s) in the public sector work. As stated by Harris *et al.* (2009: 15) "Radical new approaches require radical new actors. We need to combine the ingenuity and initiative of a diverse group of innovators – from the public sector, private companies and third sector, alongside users and communities (who are already at the forefront; p. 4) – to find new solutions to pressing economic and social problems."

2.5. Summary and considerations

This chapter brought together some key contributions of relatively fragmented and young literature of innovation in the public sector, relying partly on decades-long knowledge of innovation in the private sector, and partly on different modernisation and transformation waves of public bureaucracies.

The chapter showed that despite many services and institutions remaining non-innovative in public administration the topic will become increasingly central in years to come. More informed and quality-demanding citizens, growing budgetary pressure, aging societies, environmental and energy issues, and

global financial problems leave few alternatives for governments than to be creative, to use modern technologies and to innovate in policies, services as well as in governmental systems and networks. The chapter also showed that one should be careful in bringing decades-long knowledge and the theory of innovation developed from private sector studies directly to the public sector. However, it is still difficult to identify and isolate factors specific the public sector innovation process and it is not clear what the unique context and practice of innovation might be in the public sector. This proves the necessity for good and in many ways exploratory studies to find out the deepest roots of innovative behaviour in public sector organisations and to develop more structural understanding and institutionalising ways of innovation in the public sector. As the understanding of innovation in the public sector is very fragmented (the definition is diffuse), the perspectives where it should be studied should be well defined and narrow enough to draw meaningful, and only then generalizable, conclusions.

There are many typologies, characteristics and motivational factors of innovation in the public sector and its services, however, the relative importance of those is not much analysed and needs additional empirical exercises. It was also showed that through placing innovation at the heart of each policy area, the so-called third generation innovation policy has a unique opportunity to disseminate innovation-minded thinking across the government. In addition to that, international organisations together with technology development have boosted the phenomenon of policy learning, which happens not horizontally but often by disciplines – like technological, conceptual, institutional and policy approaches. On the other hand, the chapter showed that while studying the innovation phenomenon in governmental or other non-profit sectors, public entrepreneurship and the existence of certain key individuals is crucial to understand. To develop, motivate and retain these key people is especially crucial to secure innovativeness of government and non-profit sectors. In addition, literature suggests that innovation studies in the public sector should carefully follow the growing role of citizens and final consumers.

The next chapter analyses the current stock of empirical studies on public sector innovativeness, as well as positioning the current research in this landscape. The analysis of public sector innovation through e-government will continue in sub-chapter 4.4.

3. EMPIRICAL BACKGROUND: EXISTING EMPIRICAL PUBLIC SECTOR INNOVATION STUDIES AND POSITIONING OF THE PRESENT RESEARCH

> *"A lot of performing instincts are involved in the business of direction, but so is analysis and having a sense of literature."* Trevor Nunn

The purpose of this chapter is to analyse existing empirical works on innovation in the public sector. Together with the previous theoretical literature review chapter, these should give us a more comprehensive and structured view on how innovation in the public sector is theoretically understood and how much is known about the public sector innovation process in practice.

The chapter is divided into three following sub-chapters. The first sub-chapter analyses the landscape of existing empirical public sector innovation studies over time. The second sub-chapter positions the current research in the historical timeline of public sector innovation studies. The chapter ends with a summary and concluding remarks for the following chapters and analyses to come.

3.1. Existing empirical public sector innovation studies

With some exceptions, scientific knowledge in the area of innovation has been generally limited to the private sector. There is a lack of good empirical evidence about innovation by the public and service sectors. Moreover, there is no good or unified framework by which to analyse it. Indeed, authors increasingly stress that to be able to improve our knowledge and understanding of the rate and degree of innovation in the public sector, as well as its incentives, processes and impact, there is now an increasing awareness of the need for more systematic and comparable data on innovation in the public sector (Koch and Hauknes, 2005). Osborne and Brown (2005) also emphasise that the case for the innovative capacity of public organisations is under-researched; the literature is full of normative assertions and/or pejorative arguments (as we also saw in previous sub-chapters), but little empirical work. While analysing the existing attempts to study innovation in public sector services, they concluded that all these studies provide good descriptions of the work undertaken in public organisations, however, there is a lack of any attempt to analyse innovation as a process itself (or to

borrow from organisation studies literature, for an understanding of the nature of the phenomenon). These statements are also valid in the case of social innovations[11] (see Mulgan *et al.*, 2008). Mulgan *et al.* point out that there is surprisingly little known about social innovation compared to the vast amount of research into innovation in business and science. In their extensive survey, Mulgan *et al.* found no major datasets or long-term analyses, and few signs of interest from the large foundations or academic research funding bodies on this topic. The authors also argue that a lack of knowledge about social innovations impedes the many institutions interested in this field, including innovators themselves, philanthropists, foundations and governments, and means that far too many rely on anecdotes and hunches.

The present chapter reviews the few existing empirical and/or survey-based studies of innovation in the public and voluntary sector. Indeed, one should mention that some of the empirical studies were carried out after the present empirical research (e.g. after 2005; see table 3.2). There also exist different case study exercises made about the public sector innovation (see for example Thenint, 2010), however, due to the nature of the present research, these are not in the focus.

Public sector innovation (research) has evolved over four stages, which although they overlap, represent distinctive steps forward (Bason, 2010; see table 3.1). The stages roughly follow the overall trajectory of public management since the early 1970s, which Benington and Hartley (2001) have characterised as 'traditional', 'new public management', and 'networked government'.

Table 3.1 Evolution of public sector innovation research

	Stage I Awareness	**Stage II Cases and practice**	**Stage III Barriers**	**Stage IV Practice**
Theoretical characteristics	In 1970s and 1980s innovation in government was study object of few academicians (Mohr, 1969;	In addition to recognition that innovation is important, there is more knowledge how the concept	This stage characterises much of the conversation about public sector innovation today and has to do with	Beyond understanding the barriers, some organisations are now explicitly increasing the

[11] According to Nesta (2008), social innovations can take several forms. These include public sector innovation within public services, to improve performance or save money, and innovation in the non-profit or for-profit private sectors that improves public services or provides new ones. Social innovations from the third sector (voluntary and community groups, and social enterprises), may be 'spun-in' to mainstream public service provision.

	Walker, 1969; Gray, 1973). Realisation during past two decades that innovation is not a possibility, it is an imperative. Awareness that government must reinvent itself to adapt to new challenges and opportunities (Osborne and Gaebler, 1992). This stage is not over, however, less questioning why innovation in government.	applies to the public sector. Novel use of information technology and web 2.0 solutions vis-à-vis citizens are often dubbed innovative. During the last two decades there has been a growing number of awards and recognition that highlight the best examples of innovation in government.	barriers and dilemmas that face public innovators (Wilson, 1989; Mulgan, 2007). As augmented by Wilson, the fundamental role of organisations is to reduce uncertainty and introduce stability of routine. In other words, the very DNA of bureaucratic organisations is resistant to innovation.	ability to make innovation happen. Government leaders around the world, from Finland to Denmark to Australia and the U.S., are recognising that it is not enough to wait and hope for random flashes of inspiration. Public organisations must consciously try to tear the barriers of innovation down.

Source: Bason (2010).

The first innovation study reviewed is 'Determinants of Innovations in Organizations' by Mohr (1969), which was an attempt to identify the determinants of innovation in public agencies, i.e. the degree to which they adopt and emphasise programmes that depart from traditional concerns. Innovation was suggested to be the function of an interaction between the motivation to innovate, the strength of obstacles against innovation, and the availability of resources for overcoming such obstacles. The study group for the research included all full-time local health departments in Illinois, Michigan, New York, Ohio, and Ontario (in the U.S.), serving a jurisdiction no greater than 600,000 in population, whose chief executive – the local health officer – had occupied his current position during the entire period of 1960-1964. This group comprised 94 agencies. The data were collected primarily by interviews with the local health officers during the summer of 1965.

Two other early public sector innovation studies were conducted by Walker (1969)[12] and Gray (1973), so-called diffusion studies – The Diffusion of Innovations Among the American States and Innovation in the States: A Diffusion Study – respectively. Walker's work (1969: 881) was according to his own

[12] Walker lists the body of research on the diffusion of innovations from which he draws many insights, see for general reviews of this literature: Rogers (1962), Katz *et al.* (1963). For early attempts to study the American states from this perspective, see Davis (1930); McVoy (1940); and Sutherland (1950-51). See also Hagerstrand (1967) and Mason and Halter (1968).

words “primarily an exercise in theory building”. His aim was to develop propositions which might be used as guides to the study of the diffusion of innovations and which might also apply to budgeting and other forms of decision-making. The major questions investigated were: (1) why do some states act as pioneers by adopting new programmes more readily than others, and once innovations have been adopted by a few pioneers, (2) how do these new forms of service or regulation spread among the American states? The research was based on understanding that levels of expenditure alone are not an adequate measure of public policy outcomes. “Before we can evaluate the relative importance of structural and political factors as determinants of policy, we need to investigate decisions outside the budgetary process. In order to advance that object this study will focus on one of the most fundamental policy decisions of all: whether to initiate a programme in the first place,” he says (p. 880). The author was studying the relative speed and the spatial patterns of adoption of new programmes, not their invention or creation. He wanted to explain why some states adopt innovations more readily than others, he assumed that the pioneering states gain their reputation because of the speed with which they accept new programmes. The study therefore devised an innovation score that represented the relative speed with which states adopt innovations. The innovation score was based on the analysis of 88 different programmes, which were enacted by at least twenty state legislatures prior to 1965. New York, Massachusetts, California and New Jersey appeared to be the four fastest adopters of new programmes. Walter concluded that it is likely that the great cosmopolitan centres in the country, the places where most of the society’s creative resources are concentrated, would be the most adaptive and sympathetic to change, and thus the first to adopt new programmes. For further details, see Walker (1969).

Gray (1973) continued Walker’s work, seeking to extend the investigation of innovation by states in a more rigorous fashion. The policy areas selected were education, welfare, and civil rights. As in Walker’s study, an innovation is more specifically defined as a law which is new to the state adopting it, i.e. it is equivalent to a single adoption. Using the database of laws (innovations) in the aforementioned three policy areas, the duration of the adoption process, and number of adopters, Gray considered three questions: (1) How do new ideas diffuse or spread among the states? (2) Why are some states more innovative than others? (3) Are there identifiable patterns of innovation? An effort was made to determine if the same states were innovative in all three policy areas.

In his early work 'Incentives to Innovate in Public and Private Organizations', Roessner (1977) uses different perspectives of economic theory, organisational theory, public administration, and political science to explore the question whether public organisations are inherently less innovative than private organisations, and synthesises existing empirical evidence to test the predictions and explanations of the theory. Indeed, the empirical evidence in his article are mostly indirect. For example, "trends in employment in public and private sector may provide some indirect evidence for rates of innovation in the two sectors, because it has been argued that employment in state and local government in growing faster than total national employment at least partially because technological change in the labour-intensive public sector does not keep pace with change in the private sector" (p. 354). However, available data did not support this assertion. Similarly non-convincing results come out from alternative studies referred to, like Scherer (1970), who compared the relative performance of public and private organisations that provide the same or similar products or services (U.S. Postal Services, etc.). Or comparisons of rates of diffusion of technology and process innovations in public and private sectors as a determinant of rates of productivity increase, e.g. Mansfield (1968) for the private sector; Feller and Menzel (1976) for urban services; Russell and Burke (1975) for the hospital sector. According to the authors, the sketchy data reported did not add up to a firm conclusion other than there is no dramatic or obvious difference in innovativeness between public and private organisations. Roessner (1977) finalises that "the answer to the question whether there is anything intrinsic to public sector organisations that relegates them to lives less innovation than their private sector counterparts appears to be, theoretically, yes; empirically, maybe and maybe not" (p. 360).

One of the next wave of public sector innovation-related studies was 'Managing the Innovation Capacity of Voluntary and Non-Profit Organisations (VNPOs) in the UK' (see Osborne, 1996, 1998; Osborne and Flynn, 1997) and it explored the innovative capacity of voluntary and non-profit organisations in the field of personal social services (PSS). The authors developed a model for this capacity which draws explicitly on the management and organisation studies literature and which emphasises the significance of environmental and institutional factors in the release of this innovative capacity. Prior to the research, the author defined innovation as representing newness to the organisation concerned; innovation is different from invention; innovation is both a process and an outcome; and innovation involves discontinues change. The approach was subsequently adapted to produce a typology of organisational change in the human services. The key point was to allow

explanations of the relationships between the impact of a change upon the beneficiary group of a voluntary and non-profit organisation and upon the services that it provides. In the first stage, the VNPO study was a postal census survey. It was intended to establish what the key actors within the VNPOs understood by innovation, to discover the extent of actual innovation activity, both in terms of these perceptions and in terms of a theoretically derived typology of innovation described earlier, and to test out some basic organisational parameters, which might describe the innovative VNPOs. In total, 376 organisations were surveyed across the three localities, and 196 replied (52.1 per cent response rate). The second phase of the VNPO study was a case study research. The three cross-sectional case studies, of innovative, developmental and traditional ('non innovative') VNPOs were subsequently established across the three research sites by use of the typology described above. Twenty-four organisations were involved.

Based on the VNPO survey, the author estimated that just over one-third (38 per cent) of the VNPOs surveyed had engaged in genuine innovative activity over the previous three years. When the organisational characteristics of the innovators were explored further, using discriminant analysis, important differences were uncovered between the innovative and the traditional organisations. The former were characterised by the presence of at least one member of paid staff, the receipt of government funding as the major source of their income, and by being much younger organisations (defined as under five years old) than their peers. In their research, the following eight key issues were raised for the managers of VNPOs to consider in the context of the innovative capacity of their organisations:

(1) It is fundamentally wrong to perceive innovative capacity as an inherent characteristic of VNPOs;
(2) For those VNPOs which are engaged in innovative activity, is to be clear about the type of innovation that they are pursuing and its management implications;
(3) Rather more negative, this is to assume that the structural characteristics or internal environment of a VNPO will automatically give it an innovative capacity;
(4) Similarly, it is incorrect to put store by the importance of individual action by itself to activate the innovative capacity of a VNPO;
(5) For the managers of VNPOs to take a deliberate strategic approach to the relationships of their organisation to its environment – in terms of the local community, its key shareholders and the larger societal environment;
(6) The sixth issue concerns the funding pattern of a VNPO and its impact upon its innovative capacity. The research found that the innovative organisations were significantly more likely to

receive funding from a (local)government source than from voluntary or other income (like donations or fees);

(7) The seventh issue for the leaders of VNPOs is therefore to be aware fully of their environment and its impact upon their organisation and its innovative capacity;

(8) The final issue is one which drives directly from the one above. This is that the managers of VNPOs should not see themselves as the passive 'victims' of their organisational context. Rather, they need to be pro-active in shaping it.

The next contribution comes from Borins (2000a, 2001a, b, c, d, 2002), who has explored in a series of studies the contingent factors that impact upon the innovative capacity of public sector organisations (PSOs). Based upon extensive quantitative analysis (in North America and across the Commonwealth countries) he argues that innovation is difficult to achieve in PSOs because the rewards for it are 'meagre' whilst the consequences of unsuccessful innovation are 'grave' (Borins, 2001a). He produces a set of five characteristics of successful innovations in PSOs, as well as seven principles to guide managers in developing innovation in them (see table 2.3). Borins (1998, 2000a) has used large samples of the best applications to the Ford Foundation-Kennedy School of Government/Harvard University (Ford-KSG) innovation awards – 217 semi-finalist[13] applications from 1990 to 1994 and 104 from 1995 to 1998 – to deduce the characteristics of successful public management innovations – to study the characteristics, process, and outcomes of public management innovations. This involved coding open-ended questionnaires completed by the applicants and then producing qualitative results. In addition, he sent a questionnaire based on that used by the Ford-KSG awards to applicants to the Institute of Public Administration of Canada (IPAC) innovation awards from 1990 to 1994, a competition open to public sector organisations in Canada. A similar questionnaire was sent to applicants to the Commonwealth Association of Public Administration and Management (CAPAM) innovation awards in 1998 and 2000. This competition was open to public sector organisations throughout the Commonwealth (Borins, 2000b, 2001a). The IPAC and CAPAM questionnaires yielded a total of 116 responses (Borins, 2001c). Borins (2001c) claims that other studies of innovation in the public sector have relied on individual or small sample case studies, or small samples of innovations in a particular region or specific policy area. These use large samples, many regions of the world, and many policy areas. They are therefore representative of the best public management innovations.

[13] Approximately 1,500 initial applications come in each year (the initial application form is not hard to complete and the organisers make strenuous efforts to encourage as many public sector innovators as possible to apply).

The questionnaires asked applicants what they thought was innovation in their programme. The most frequent characteristic, observed in approximately 60 per cent of programmes, was 'holism', namely that the innovation depended on inter-organisation cooperation, that it delivered multiple services to individuals, or that it took a systems approach to a problem. The following three most frequent responses, all observed in approximately 35 per cent of applications, were that the innovations involved process reengineering, that they applied information technology, and that they developed alternative service delivery mechanisms such as contracting out to the private sector or partnership with the voluntary sector. The fifth most frequent characteristic, encountered in 25 per cent of the applications, was the empowerment of staff or citizens. Since some respondents gave multiple answers (as also for questions below), these numbers sum to more than 100 per cent (Borins, 2001c). A common denominator of all five of these characteristics of public sector innovation is that they look very much like private sector (Borins, 2001c). In a review article on private sector innovations, Kanter (1988) noted as a defining characteristic of innovation the crossing of organisational boundaries, requiring different units of a corporation, or different corporations, to cooperate. Process reengineering and the application of information technology are also important routes to private sector innovation. Alterative service delivery in the public sector corresponds to private sector outsourcing, undertaken to enable a firm to focus on its core mission. Finally, staff and citizen empowerment in the public sector corresponds to staff and customer empowerment in the private sector (Borins, 2001c).

Who are the originators of public management innovations according to Borins' research? Innovations in the public sector are traditionally viewed as coming from the top. However, the innovation awards examined told a different story. In all of them, approximately 50 per cent of the innovations originated from middle managers or frontline workers, 25 per cent from agency heads, 20 per cent from politicians, 15 per cent from interest groups, and 10 per cent from individuals outside government (some respondents gave multiple answers, therefore there was more than 100 per cent in total). The reason might be that in both the private and public sector organisations, the lower and middle levels contain many younger people who are closer to the cutting edge thinking they encountered at university. Generally, this thinking is also common to the total quality management (TQM) movement, which believes that ensuring quality is the responsibility of everyone of the company, regardless of their position or level of formal education (Borins, 1998, 2000a, b, 2001a, c).

What conditions lead to public sector innovations? The conditions/challenges that lead to the innovations fell into five groups, which according to their importance were the following:

(1) Internal problems (such as the inability to reach a target population, inability to meet demand for a programme, resource constraints, or an inability to coordinate policies), appearing in 50-60 per cent of the innovations in every sample;
(2) Crisis, defined as a current or anticipated publicity visible failure or problem, also around 30 per cent of the innovations in every sample;
(3) Initiatives coming from the political system, also around 30 per cent of the innovations in every sample;
(4) New opportunities, created either by technology or other factors, also around 30 per cent of the innovations in every sample;
(5) New leadership appeared least frequently, in approximately 10 per cent of innovations.

Borins (2001c) concluded that innovation awards have discovered many instances of individual innovations, disseminating them, and inspired many more. Indeed, the challenge for public sector organisations is to go beyond individual innovations to create a climate supportive of on-going innovation on a large scale. "Perhaps the efforts of persistent individual innovators, coupled with some important systemic changes, will create a new reality", he says (p. 319).

The following study 'Survey of Electronic Commerce and Technology 2000' was conducted by Statistics Canada (see Earl, 2002, 2004). As indicated earlier, when applying the Oslo Manual (OECD/Eurostat, 2005) methodology on measuring technological change to the Canadian public sector institutions, the authors discovered that the public sector was leading the private sector in technological change and it was supporting new technology acquisition. The study found that technology adoption levels in the public sector are very high; 82 per cent of public sector organisations surveyed between 2000 and 2002 bought or acquired new information technology, compared with just 42 per cent of private sector firms.[14]

As part of efforts to promote public sector innovation, Bloch (2010) refers also to the Korean Government Innovation Index (GII).[15] The GII, which was implemented over 2005 and 2006, seeks to measure government innovation efforts, develop a tool for autonomous diagnosis and improvement of

[14] Indeed, when larger organisations of the same size (with more than 500 employees) were compared, there was little difference in the rates of technology adoption between the private and public sectors.
[15] This short description of the Korean GII is based on PowerPoint presentations by the Korean Ministry of Government Administration and Home Affairs (2005) and Yoon (2006).

innovation capabilities at each institution, and to benchmark government institutions. The GII is a web-based tool, where organisations can enter their own innovation data, and then the tool conducts a series of diagnostic analyses based on the organisations data and a previously collected set of data that is used as a comparison standard. The GII consists of a survey covering four areas of organisational capability (innovation leadership, vision and strategy, personnel capability and systemisation of management), the degree of adoption and implementation of pre-specified management systems and other programmes, and barriers to innovation.

Another contribution from the same period comes from the Norwegian NIFU STEP Institute, an EU Fifth Framework Programme Project on innovation in the public sector called Publin (coordinated by Per Koch). Publin has studied policy learning and technical and administrative innovation in the public sector, and tried to get a better understanding of behavioural changes, learning processes and the implementation of new or improved technologies in public organisations. The study covers innovation in policy-making organisations, regulatory agencies and public enterprises, and takes into consideration the influence cultural traits, politics, management, networks and co-operation, entrepreneurship and evaluations have on innovation. The Publin contractors published a series of analyses and reports (see Koch *et al.*, 2005, 2006; Halvorsen *et al.*, 2005; Maroto *et al.*, 2005; Kemp and Weehuizen, 2004; Røste, 2005; Vigoda-Gadot *et al.*, 2005; Malikova *et al.*, 2005; Cunningham, 2005). The reports and analyses focused on the structure and size of public sector in Europe; on differences between the public and the private sector; on policy learning; on existing studies and the theoretical framework of innovation in the public sector; on innovation in the social sector; and on innovation in the health sector. As a result, two reports, a non-academic and an academic were produced (see Koch *et al.*, 2005, 2006). The project also makes eleven national case studies on different public sector projects across Europe. The Publin public consortium includes ten European academic institutions/research centres.

The empirical side of the Publin project recognises three sets of antecedents: informational, organisational, and top management dimensions (Vigoda-Gadot *et al.*, 2005). The information dimension was divided into narrower areas of information management, information generation, information dissemination, and responsiveness to information. The organisational dimension consisted internal communication, organisational structure, internal politics, and employees' participation in decision-making. The top management dimension was characterised as the management's attitude

towards change, top management emphasis on and support for innovation, and top management vision (as a future, positive image of the organisation). Definitions and components of innovation included (a) creativity, (b) risk-taking, (c) organisational openness to change, (d) future orientation, (e) pro-activeness, (f) and organisational and policy learning.

Samples were collected in all nine countries participating in the Publin project, with a goal of at least 100 respondents from each country for the manager/employee survey, and at least 50 for the end-user survey. Each country's research team chose which sector of the public sector – health or social services – to sample for the manager/employee survey. The quantitative part of the survey focused on 163 in-depth interviews with public sector managers and frontline employees from all nine participating countries (on average 18 per country). The study used organisational theory, public administration and management theory, and innovation theory as the theoretical framework for analysis. Interviews were conducted in the countries' original languages. From the quantitative side, all scales employed in the survey used 1-5 Likert scales where 1=definitely disagree and 5=definitely agree.

The manager/employee survey questions were about: (a) antecedents: information generation, information dissemination, responsiveness, internal politics, connectedness, and centralisation; (b) outcomes: innovations' performance and overall performance, commitment, and work satisfaction; (c) innovativeness: organisational openness to change, risk-taking, future orientation, pro-activeness, and innovativeness; and (d) learning organisation: innovation, learning orientation, and learning.

End-user survey questions were about: (a) antecedents: connectedness, employee professionalism, ethics and morality, internal politics, promoters of innovation, public sector leadership/vision, and responsiveness; (b) outcomes: image, satisfaction from services, and trust in institutions; (c) innovativeness: innovation, and innovativeness; and (d) organisational characteristics: main function, aim of influence, and innovativeness.

As part of the main conclusions, Publin mapped different types of barriers and drivers for innovations, i.e. social phenomena that hinder or encourage innovation activities in such institutions (see Koch *et al.*, 2005). The main innovation barriers (based mainly on open-ended questions during the in-depth interviews) identified were the following:

- Size and complexity (the public sector comprises extremely complex and large-scale organisational entities that may develop internal barriers to innovation);
- Heritage and legacy (public sector organisations are prone entrenched practices and procedures);
- Professional resistance (there are professional groupings with their own communities of practice, belief systems and perspectives);
- Risk aversion (public organisations are under the close scrutiny of both politicians and the media, and employees are normally rewarded for taking risks);
- Need for consultation and unclear outcomes (the large range of stakeholders involvement generates a strong requirement to consult and review any planned changes);
- Pace and scale of change (there have been so many reforms that employees are becoming 'innovation fatigued');
- Absence of capacity for organisational learning (there may be a lack of structures or mechanisms for the enhancement of organisational learning);
- Public resistance to change (elements of the public might be risk-averse);
- Absence of resources (there may be a lack of financial support or shortages of relevant skills or other support services);
- Technical barriers (there may be a lack of technological solutions to the problem at hand).

Vigoda-Gadot *et al.* (2005) specify that barriers to innovation in the public sector are predominantly internal to the organisation. The findings show that interviewees perceive barriers to innovation as deriving from the public service's leadership and management (i.e. budget cuts or poor allocation of budget funds, and poor leadership). Additional obstacles are the traditional regulations and work routines, employee resistance, internal and external politics, poor learning environment, and end users' resistance. Controversially, in private sector services, at a broad level, surveys tend to show that the external conditioning factors are seen as more significant barriers to firm innovation than internal barriers (see Howells and Tether, 2004).

As technology innovation is often driven by suppliers (vehicles, devices, telecommunications) as found by Vigoda-Gadot *et al.* (2005), it might also lead towards larger technological risks. Indeed, public health systems studied in the same Publin project (see Koch and Haukens, 2005) appear to share a number of common features which could act in a way to hinder or prevent the process of innovation. Although a number of categories were identified, they were rarely mutually exclusive and one barrier may be the cause or effect of one or several others in a complex interplay. This may lead to (also technological) risk aversion with an understandable inherent resistance (which is particularly strong in the medical professions) to undertake or implement changes which may result in an increased probability of risk (to the patients in their care or to the other recipients of their services).

The main innovation drivers (based mainly on open-ended questions during the in-depth interviews) identified were the following:

- Problem-oriented drivers (people innovate in order to solve certain problems);
- Non-problem oriented drivers (innovation may improve on the former situation);
- Political push (strategic change frequently requires strong, top-down political will);
- Growth of the culture of review (assessment practices may simulate innovation);
- Support mechanism for innovation (authorities may implement policy measures aimed at funding and encouraging innovation);
- Capacity for innovation (public employees have often high levels of professional expertise, creativity and problem solving);
- Competitive drivers (performance targets may encourage the use of innovative approaches);
- Technological factors (technological innovation can be a strong determinant for subsequent innovation);
- NGOs and private companies (models developed by NGOs and private companies may be adopted by public institutions).

In addition, Vigoda-Gadot *et al.* (2005) found that all of the participants could be initiators of innovation in the public sector. However, managers and frontline employees are the primary initiators of innovation, followed by employees, other organisational personnel and professionals, government and politicians, end-users and external organisations. While the majority of innovations in the public sector are top-down and policy-driven, findings show that interviewees generally see the organisation's management or political parties rather than external organisations or the EU as the initiators of new approaches. Indeed, facilitators of innovation are predominantly internal, organisational forces that include the leadership and management, cultures open to change, supportive personnel and proper funding. External facilitators include the EU, the legislature, or national initiatives, as well as information, learning, and networking.

The Publin study also stresses the importance of learning for innovation. Public institutions ought to develop in-house learning strategies needed to find, understand and make use of competences developed elsewhere. Public organisations should develop inter- and intra-organisational networking; they should develop and use indicators for innovation and organisational performance. Organisations, and especially coordinators higher up in the public hierarchy, may benefit from developing systematic plans for evaluation of organisations as well as policy strategies. The authors also stress the importance of policy learning, the need for development of appropriate belief systems and entrepreneurship, the need to convince stakeholders of the potential and actual benefits arising from innovation (to minimise

risk aversion), that the innovations should have clear and sensible objectives, that policy makers should design structures and systems to promote, simulate and disseminate innovation in the public sector and between the public, private and third sector, and finally, that policy makers should develop proper methods of measuring innovative activity. From the EU perspective, the Commission should contribute to the development of a broad-based 'third generation' innovation policy that also encompasses the public sector. Such a policy should encourage policymakers to move beyond the technological perspective of innovation and promote the concept of organisational, process and conceptual innovation (see Koch *et al.*, 2005, 2006).

Finally, the majority of the interviewees reported differences between innovation in the public and in the private sectors (see Vigoda-Gadot *et al.*, 2005). A few indicated that they were not knowledgeable or familiar enough with the private sector. However, most surprising, some interviewees claimed that there were no differences between innovation in the public and the private sectors. Similarities in innovation between both sectors included the need for budget allocation and market orientation.

There are also a few more recent public sector innovations studies available about the UK central and local governments (as also reviewed by Bloch, 2010). The UK National Audit Office has studied innovation in central government twice: 'Achieving Innovation in Central Government Organizations' (2006) and 'Innovation Across Central Government' (2009). The reports are based on a survey of innovation in central government departments, executive agencies and non-departmental public bodies; however, they differ in terms of focus and content.

The 2006 survey was the first of these independent assessments of innovation in central government (prepared by the Public Policy Group of the London School of Economics) and it asked for nominations of innovations and each questionnaire focused on a single innovation. The survey in particular deals with the driving forces behind the innovation, both internal and external, potential positive and negative impacts of the innovation, and barriers to achieving innovation. The final report draws on evidence from 125 specific cases (returned by 85 central departments and agencies) to assess the progress to date in developing innovative solutions to improving government productivity and effectiveness. The survey was combined with an extensive programme of interviews with civil servants across Whitehall and with outside stakeholders and experts; a set of focus group discussions of survey results with different kinds of public and private sector stakeholders; and some brief comparator studies

of innovation in overseas governments, local authorities and private companies. Then the National Audit Office inspected government innovations in 2009, they found in particular, that central government organisations needed to improve their understanding about where the potential for innovation lies, increase the incentives for individuals to innovate, strengthen their ability to learn from one another and improve the pace at which innovations are implemented (see National Audit Office 2009). The purpose of the 2009 survey (data from 2008) in contrast to the 2006 report was the public sector organisation as a whole (Bloch, 2010). The fieldwork consisted of a literature review, survey of central government organisations, eleven case example interviews, online discussion forums, semi-structured interviews, and analysis of secondary data. The survey inquires about organisations' own conceptualisation of innovation, and how the organisation innovates, including culture and capabilities, risk management, drivers, incentives and barriers that can impact upon their innovative capability.

The UK Audit Commission has also conducted a survey of innovation among local authorities in England – 'Seeing the Light: Innovation in Local Public Services' (Audit Commission, 2007). The study covers attitudes to innovation, the role of organisational structure and staff, barriers and enabling conditions, and learning activities. It also highlights a number of specific examples of innovations in local government. The survey of all local councils and fire authorities, conducted in 2006, found that 43 per cent of respondents reported that 'a great deal' of innovation was taking place in their organisation, and a slightly higher proportion (52 per cent) were of the view that 'some' innovation was taking place. Only 2 per cent of respondents said that there was hardly any innovation taking place within their organisation. In addition, ten case studies were conducted that covered a range of activities including: community engagement and planning, delivering shared services, e-enabled service provision, and democratic renewal.

The UK Department of Health and NHS have initiated a project (Ayling *et al.*, 2009) to measure and value innovation in the NHS. The project seeks to develop indicators of innovation at the three stages of the innovation process (ideas, growth, diffusion) and indicators of innovation culture. Data on these indicators will be collected from health institutions and benchmarked against targets for the generation and subsequent development of new ideas, and their adoption and dissemination.

The UK Centre for the Measurement of Government Activities (UKCeMGA), under the ONS, was established to implement the recommendations of the Atkinson Review, an independent review of the

future development of government output and productivity (Atkinson, 2005). Both the review and subsequent work by UKCeMGA reflect an increased governmental and public interest in measures of public sector performance. In addition to a general framework and principles, the intention is to focus on practical solutions for measuring the key functional areas of health, education, public order and safety and social protection. This work has made considerable progress in developing aggregate measures of public sector output within these key sectors. However, at the same time this work reveals the complexity of measuring economic and social outcomes of public services.

From the international organisations' side, OECD Education has initiated a project (OECD, 2009) on the measurement of innovation in education. The group has established a forum for investigating relevant work in this area and discussing key questions on how to measure innovation in education and benefits and limitations of different approaches. The OECD is currently working on a project on a set of indicators (Government at a Glance) to measure six stages of government activities (revenues, inputs, public sector processes, outputs, outcomes, antecedents) (OECD, 2007). The working and technical papers of this project provide a broad overview of the use of quantitative indicators, along with some key issues. In general, the work by Government at a Glance does not deal with public sector innovation explicitly, though knowledge of output and other measures of government activity is very relevant for innovation measurement (Bloch, 2010).

The largest exercise to measure innovation in the public sector is the project called MEPIN - 'Measuring Innovation in the Public Sector in the Nordic Countries: Toward a Common Statistical Approach' ('Copenhagen manual'). MEPIN was initiated by the Danish Ministry of Science, Technology and Innovation, and includes a consortium of research and statistics institutions from the Nordic countries. Furthermore, the project was co-financed by Nordisk Innovations Center (NIC) and the project was lead by DAMVAD, a Danish-based research and consulting company. The purpose of the project was to develop a measurement framework for collecting internationally comparable data on innovation in the public sector, which both would contribute to our understanding of what public sector innovation is and how public sector organisations innovate and would develop metrics for use in promoting public sector innovation (see the report: Bloch, 2011). The work was inspired from the understanding that efforts to understand better and to promote public sector innovation are greatly hindered by a great lack of quantitative evidence. "There is a pressing need for a common conceptual framework of public innovation and guidelines for collecting internationally comparable data covering

the main dimensions of public sector innovation," the project authors stressed on their project website (Pepin, 2009: front page).

The first phase of the MEPIN project is documented through six papers and based on this work, a pilot study was conducted among public sector organisations in Denmark, Finland, Iceland, Norway and Sweden between May and October 2010. The questionnaire type varied from an electronic version in Iceland, Norway and Sweden, and postal survey in Denmark and Finland. The results of the pilot studies and an assessment of the methodologies used are presented in 'Report on the Nordic Pilot Studies – Analyses of Methodology and Results' (see Bugge *et al.*, 2011). A common Nordic questionnaire, which was developed, was inspired from the Community Innovation Survey questionnaire based on the Oslo Manual (OECD/Eurostat, 2005), covering the following topics dealing with innovation in public sector organisations: innovations, innovation activities and expenditures, the objectives of innovations, information channels for innovation activities, innovation cooperation, external funding for innovation, innovative procurement practices, driving forces of innovation, innovation strategy, management and competences, and barriers to innovation. The statistical unit of the population was defined using the KAU-concept[16] (Kind-of-Activity-Unit) and the distinction was made between units administrating services and units producing services (direct providers). The total sample of the Nordic pilot survey was 363 units and the response rate varied between 42 per cent in Denmark and 77.6 per cent in Iceland. Although the survey measured separately product innovation, process innovation, organisational innovation and communication innovation, when looking at overall innovation, shares were very similar across countries: 78 per cent for Sweden and Finland, 83 per cent for Norway, 86 per cent for Denmark, and 88 per cent for Iceland.

Finally, the UK National Endowment for Science, Technology and the Arts (NESTA) has conducted a pilot survey for measuring innovation across the public sector (see Hughes *et al*., 2011). They developed and tested their survey-based index approach during the summer and autumn of 2010, across two parts of the public sector: the NHS and local government. The project developed and piloted a survey-based approach to measuring innovation in the public sector, with participation based on a voluntary, or self-selected, approach. The survey looked at organisations through four lenses: (1)

[16] KAU (see the Oslo Manual §237) is defined as "An enterprise or part of an enterprise which engages in one kind of economic activity without being restricted to the geographical area in which that activity is carried out".

innovation activity – describing the pipelines of ideas flowing through an organisation and the effectiveness of the key associated innovation activities in areas such as accessing, selecting, implementing and diffusing ideas, (2) innovation capability – describing key underpinning capabilities like management of innovation, leadership and culture and organisational enablers of innovation, (3) impact on performance – describing the impact of innovation activity on outcomes and service and efficiency measures, and (4) wider sector conditions – describing how the system in which an organisation operates helps or hinders innovation. Before the survey, the project compared the frameworks, findings and NESTA observations of four Innovation Index exploratory project reports produced in October 2009 (CFA DAMVAD, 2009; Deloitte, 2009; Ernst and Young, 2009; The Innovation Unit, 2009). See also related pre-studies from Dunleavy *et al.* (2008) and Clark *et al.* (2008). Dunleavy *et al.* (2008) propose a range of aggregate indicators across the dimensions of R&D activities, consultancy and strategic alliances, intangible assets, ICT infrastructure, human resources, institutional performance, E-Government, origins of innovations, innovation outputs, impacts and scope. A central framework of the proposal in Clark *et al.* (2008) was to conduct an innovation survey along the lines of that done for the business sector, modified to capture the particularities of public sector innovation.

Two sectors, the NHS and local government, were selected based on prior indications of demand, potential participation and also the ability to draw meaningful sector insights from an anticipated sample size of up to 100 interviewees per sector. Final participation was 16 per cent of the population in health (64 interviews) and 31 per cent of the population in local government (111 interviews). In each case, if possible, then the most appropriate person in their organisation responsible for innovation and improvement was interviewed. Each interviewee commented on behalf of the organisation as a whole and, in return, received an individual organisation scorecard along with the overall findings. In developing the questionnaire, the questions from NESTA's Private Sector Index survey questionnaire (Roper, 2009) were used as a starting point. Questions were tailored to suit the public sector innovation framework and where required added questions from either international survey instruments where appropriate – the Nordic MEPIN Pilot Survey – or completely new questions. Approximately half of the questions in the survey are adapted from NESTA's Private Sector Index survey questionnaire.

3.2. Positioning of the present research within the wider context of public sector innovation studies

The notion that innovative capacity of public organisations is under-researched is true, however, there is a growing attention to conduct such studies. The previous sub-chapter reviewed the few existing empirical and/or survey-based studies of innovation in the public and voluntary sector. The following table 3.2 shows chronologically how the public sector empirical innovation research has evolved.

Table 3.2 Positioning the current empirical study in the timeline of public sector innovation research

Year of Data	Stage I Awareness	Stage II Cases and practice	Stage III Barriers	Stage IV Practice
Prior to 1965	The Diffusion of Innovations Among the American States, Walker (1969)			
1965	Determinants of Innovations in Organizations, Mohr (1969)			
Prior to 1969	Innovation in the States: A Diffusion Study, Gray (1972)			
Prior to 1977	Innovate in Public and Private Organizations, Roessner (1977)			
1996		Managing the Innovation Capacity of Voluntary and Non-Profit Organisations (VNPOs) in the UK, Osborne (1996, 1998); Osborne and Flynn (1997)		
1990-1998		Public Management Innovation based on Ford-KSG innovation awards 1990-1994 and 1995-1998 in the USA, and Institute of Public Administration of Canada (IPAC) innovation awards 1990-1994, Borins (1998, 2000a)		
1998-2000		Public Management Innovation based on Commonwealth Association of Public Administration and Management (CAPAM) innovation awards 1998-2000, Borins (2000b, 2001a, 2001c)		
2000		Survey of Electronic Commerce and Technology in Canada, Earl (2002, 2004)		
2005		**The present research; first published in Pärna and von Tunzelmann (2007), Innovation in Public Sector: Key Features Influencing the Development and Implementation**		

		of Technologically Innovative Public Sector Services
2005-2006		Innovation in the Public Sector 'Publin', Koch *et al.* (2005, 2006)
2005-2006		Korean Government Innovation Index, Korean Ministry of Government Administration and Home Affairs (2005); Yoon (2006)
2005-2006		Achieving Innovation in Central Government Organizations, National Audit Office (2006)
2006		Seeing the Light: Innovation in Local Public Services, Audit Commission (2007)
2008		Innovation Across Central Government, National Audit Office (2009)
2010		Innovation in Public Sector Organisations: A Pilot Survey for Measuring Innovation Across the Public Sector in the UK, NESTA, Hughes *et al.* (2011)
2010		Measuring Innovation in the Public Sector in the Nordic Countries: Toward a Common Statistical Approach ('Copenhagen manual') 'Mepin', Bloch (2011), Bugge *et al.* (2011)

Source: Composed by author; stage I-IV original definitions from Bason (2010), see also table 3.1

There is clear evidence that after 2005-2006 the attention towards public sector innovativeness has significantly grown – more than half of empirical studies and initiatives reviewed originated from 2005 and later. This proves the timeliness of the present research with original exploratory survey conducted in 2005 (first published in 2007). It can be clearly recognised that if in late 1970s, 1980s and 1990s innovation in government (if at all) was largely a study object of academics, then in 2000s it has become the focus of national experimental policy agencies (e.g. NESTA in the UK), National Audit Offices (e.g. in Australia and the UK), and National Statistical Offices (e.g. in Canada and the Nordic countries). In addition, the attention of international multilateral organisations towards public sector innovativeness has grown over recent years (e.g. OECD and the EU).

All these studies of innovation in public and non-profit sectors described have created some new and more empirically grounded knowledge of why and how the innovation process takes place in these sectors. However, from the perspective of the present research and its research question, they all have different shortcomings, especially the ones produced before the present exploratory survey (e.g. before 2005). For example, the VNPO study: despite making a significant contribution to studies of innovation public service organisations (PSOs), Osborne's work concentrated only on voluntary and non-profit institutions (VNPSs). The study did not covering the services developed and/or provided directly by public sector institutions. From the theoretical side; the author draws extensively upon the managerial

and organisational studies literature in developing his theoretical model of the innovation capacity of VNOPs, however, he almost neglects the possible contribution of innovation management, as well as systems of innovation literature. The study did not focus on existing 'predefined' innovation cases (like best practice studies usually do). The study was established more to understand what the key actors within the VNPOs understood by innovation, and to discover the extent of their actual innovation activity. The research was also not concentrated on technological improvements; instead, it was based on four types of organisational change determined by service (new, existing or improved) and beneficiary group (new or existing).

Secondly, Borins' study on innovation award cases was targeted more towards management innovations than technological ones. It was a pure best practice research, giving very little about the negative issues, and more importantly it neglected hampering factors related to the innovation process. The study had wide and polar case profiles, however, it did not differentiate sectoral or innovation-type specific results. The study involved coding of open-ended questionnaire results received from the respondents, and then producing a quantitative database. However, this methodology makes it harder to perform serious statistical analyses/exercises.

Thirdly, the Publin research focuses mainly on organisational innovativeness. Publin surveys were random, i.e. they did not predefine and preselect innovative cases. Moreover, they asked relatively broad and basic questions like "how would you define innovation" and "can you give examples of significant innovations in your organisation in past three years". In addition, only two fields of public sector were studies – social services and health services. Another weakness of the Publin survey is that it does not give the results on accurate scales. The problem is that many possible characteristics of innovation in public sector can be 'predicted', without empirically studying them (as we saw in the literature review sub-chapters). The benefit should be in showing the importance of different factors, goals, etc. (i.e. which are more, and which are less important). This also adds value if we want to bring out specific differences between public and private sector innovation process. The Publin study lacks concreteness in its conclusions; soft sayings such as "there may be a lack of technological solutions to the problem at hand" are not too convincing (Koch *et al.*, 2006: 2).

3.3. Summary and considerations

By analysing the few existing empirical studies of innovation in public and non-profit sectors, this chapter showed how much (or little) is known about this increasingly important topic in practice. The chapter also positioned the present research within the wider and historical context of public sector innovation studies.

From the chapter, it become evident that empirical innovation research in the public sector is much less developed than in the private sector. The topic is also methodologically underdeveloped and, therefore, the landscape of innovation studies relatively chaotic. On the other hand, there is no quantitatively analysable public sector innovation data available. In addition, the majority of the existing research is qualitative. However, these are governments that need to innovate to survive the continuum of diminishing public budgets, growing citizen demand, societal and environmental challenges. Moreover, as Harris *et al.* (2009) has well said, this challenge becomes more complex as radical new approaches require radical new actors and it is needed to combine the ingenuity and initiative of a diverse group of innovators – from the public sector, private companies, and the third sector, alongside users and communities – to find new solutions to pressing economic and social problems. Therefore, it is needed to strengthen the methods by which innovations in the public sector are discovered, developed, and diffused. The mission of the present research is to contribute to these challenges in an exploratory way. The current research is concentrated on both, developing a more solid framework by which to analyse public sector innovativeness, as well conducting an exploratory empirical survey analysing the technological innovation process, influencing (supporting and hampering) factors, related external relations and learning, etc. in the public sector services.

4. DEVELOPING A CONCEPTUAL FRAMEWORK FOR ANALYSING THE INNOVATION PROCESS IN PUBLIC SECTOR SERVICES

> *"A complex system that works is invariably found to have evolved from a simple system that works."* John Gaule

The previous two chapters were syntheses of theoretical and empirical understandings of modernisation, transformation and innovation in the public sector. We also know that organisational and environmental antecedents have held a central place in debates about the capacity of organisations to innovate for over four decades (Borins, 1998; Burns and Stalker, 1961; Damanpour, 1991; Light, 1998; Tidd, 2001). According to Walker (2008), studies have variously pointed toward the benefits of organic structures, specialisation, resources and communication, and environmental conditions associated with uncertainty and complexity. This evidence base is undoubtedly rich; however, it is primarily drawn from studies of private organisations, and as Light (1998) has argued provides conflicting conclusions; organisations are simultaneously expected to have loose and tight organisational characteristics, be big and little, young and experienced, and specialised and unified. Walter (2008) also suggests that it will be necessary to model the incremental nature of innovation adoption by examining the effects of lagging and current innovation together with organisational and environmental characteristics on organisational innovativeness. Regression analysis by Walter (2008), based on data drawn from a survey of English local authorities (for data collection procedures and pilot information, see Enticott, 2003), also suggest that organisational and environmental antecedents and innovation types provide the strongest explanation for the adoption of the innovation types studied.

The present chapter draws a unique conceptual framework for further survey and empirical analyses of this thesis with the ultimate goal to understand the key features influencing the development and implementation of technologically innovative public sector services and the system in which it occurs. The framework developed has four different theoretical perspectives. These perspectives (and the framework developed out of them) should allow us to study, analyse and understand the process of innovation in technologically innovative public sector services. The first perspective is the organisational view. In the majority of ways, innovation is still an organisational issue, which might (or

might not) be linked to technology, new products or services. As success of organisations is multi-factored, there are many organisational and managerial issues related to innovation. Success is a matter of competence in all functions, and of balance and coordination between them, and not of doing one or two things brilliantly. The second perspective is the learning view. The role of knowledge in the innovation process is strongly emphasised, perhaps most strongly by the evolutionary literature as well as by the literature of the knowledge-based economy. Knowledge is seen as the fundamental resource in the modern economy, and accordingly, the most important process seen is learning. The third perspective of the research framework is the technological view. It is widely acknowledged that technological change and innovation are major drivers of productivity growth, economic growth and lie at the very heart of the competitive process. However, technological advances are also seen as once-in-a-century possibilities for the transformation of government (as they have done with the business world). E-government is a rapidly growing phenomenon; it has an increasing impact on the work of the public sector; it absorbs an increasing proportion of public sector budgets; and it 'promises' solutions to many public sector problems. The fourth perspective is the systemic view. This approach is justified by the general argument that innovation takes place in a system, consisting of individuals, firms and institutions, and within a certain cultural and regulatory framework.

4.1. Organisational view on the innovation process

The first perspective of the research framework of the present study is organisational. The classical linear model of innovation (a theoretical construction of industrialists, consultants and business schools, seconded by economists, see Godin, 2005) postulated that innovation starts with basic research, followed by applied R&D, and ends with production and diffusion.[17] Very few people defend such an understanding of innovation anymore: "Everyone knows that the linear model of innovation is dead", claimed Rosenberg (1994: 139), but it is not always the case. Godin (2005) argues that the long survival of the model, despite regular criticisms, is due to statistics. Having become entrenched with the help of statistical categories for counting resources and allocating money to science and technology,

[17] The linear approach is often linked to the so-called 'technology-push model'. In the innovation literature (see Martin, 1994), there is a distinction between *technology-push* and *market-pull* or *demand-pull* models of innovation. A technology push implies that a new invention is *pushed* through R&D, production and sales functions onto the market without proper consideration of whether or not it satisfies a user need. In contrast, an innovation based upon market pull has been developed by the R&D function in response to an identified market need.

and standardised under the auspices of the OECD and its methodological manuals, the linear model functioned as a 'social fact'. Rival models, because of their lack of statistical foundations, could not easily become substitutes. Indeed, according to innovation management theory (see for example Rothwell 1977, 1992; Tidd *et al*., 2001), success is multi-factored. Studies show that, in general, successful innovators outperform failures across the board. There are no simple single-factored explanations as success is a matter of competence in all functions (Cooper and Kleinschmidt, 1988), and of balance and coordination between them, and not of doing one or two things brilliantly well. Moreover, as noted by Rothwell (1992), the success factors are more or less common to all industries, although their rank order or importance can vary from sector to sector. Therefore, this should be also true for the public sector, however, according to the knowledge of the author, it has almost never been so analysed.

Despite more than four decades of empirical research designed to determine the characteristics of technologically progressive firms, and the factors associated with success or failure in innovation, there still exists no precise prescription or recipe for successful innovation. Perhaps it is due to the fact that every innovation process is unique, so as every organisation, and every leader of the innovation project. Nevertheless, there are some basic characteristics established in the literature, which are agreed to be necessary for successful innovation projects. Firstly, after assessing nine systematic and comprehensive innovation studies undertaken during the 1950s, 1960s and 1970s, Roy Rothwell (1992) summarised the most important success factors influencing innovation as the following (in no particular order):

1. The establishment of good internal and external communication; effective linkages with external sources of scientific and technological know-how; a willingness to take on external ideas.
2. Treating innovation as a corporate-wide task: effective functional integration; involving all departments in the project from its earliest stages; ability to design for 'makeability'.
3. Implementing careful planning and project control procedures: committing resources to up-front screening of new projects; regular appraisal of projects.
4. Efficiency in development work and high quality production: implementing effective quality control procedures; taking advantage of up-to-date production equipment.
5. Strong market orientation: emphasis on satisfying user-needs; efficient customer linkages; where possible, involving potential users in the development process.
6. Providing a good technical service to customers, including training where appropriate; efficient spares supply.
7. The presence of certain key individuals: effective product champions and technological gatekeepers.

8. High quality of management: dynamic, open-minded managers; ability to attract and retain talented managers and researchers; a commitment to the development of human capital.

In addition to these project execution-type success factors (Rothwell, 1992), Cooper (1980) has highlighted, among others, the following three additional kinds of variable important for success:

- The nature of the product: specifically its uniqueness/superiority and the economic benefit it confers upon the customer.
- The nature of the market: intensity of market need, market growth rate and market size.
- The achievement of technical and production synergies between the new product and existing products (importance of cumulative know-how).

One of the first empirical studies on innovation, a project called SAPPHO, had also made similar conclusions before (see Rothwell *et al.*, 1974). The two-phase project consists of a comparative analysis of 'paired' successful and unsuccessful technological innovations, where one half of the pair is a commercial success and the other a commercial failure (in the fields of chemical processes and scientific instruments). Five main areas of difference between successful and unsuccessful innovators emerged, related to the innovator's understanding of user needs, efficiency of development, characteristics of managers, efficiency of communications and marketing and sales efforts.

Innovation management literature (see Rothwell, 1977, 1992, 1994; Tidd *et al.*, 2001) stresses the importance of the ten following 'strategic level' factors influencing the innovation process and its success.

First, top management commitment to, and visible support for, innovation: it is about top management visibility, shared vision, leadership and the will to innovate. It is also important to overcome the barriers and resistance to innovation. Indeed, according to Wilson (1989), high-level government executives are mostly preoccupied with maintaining their agencies in a complex, conflict-ridden, and unpredictable political environment. Moreover, as stated by Mahbubani (2011b), there is a constant shortage of leaders in the world who rule with their head and heart. A special emphasis is on the word 'leader' because in the majority of cases the management of changes is required that relies upon providing inspiration (visions) for and building confidence in a large number of people (for further discussion, see sub-chapter 2.1). The latter is true in terms of political leaders as well as top executives of public sector organisations.

Secondly, long-term corporate strategy in which innovation plays a key role: innovation should not be an ad hoc process, but one that has direction and purpose. Properly planned, one project can contribute to the next project and so on. In other words, a coherent strategy enables firms to build on past successes and to capitalise effectively on emerging strengths (see Rothwell and Zegveld, 1985). Firms need a strategy in order to obtain technical, marketing and production synergies between different projects. Public strategy, however, is more complex. According to Mulgan (2009), public strategy is the systematic use of public resources and powers, by public agencies, to achieve public goals. He stresses the meaning of the word strategy, which comes from the Greek 'strategos', a general. A word, which brought together 'stratos', the idea of something that is spread out (an army or multitude), with a word 'agos', the idea of leadership. From the public sector perspective, the question is how the sprawling mass of public agencies, laws services, embassies, armies, and laboratories that make up a modern state can be led in the same direction and serve the public interest that lives well beyond the state (Mulgan, 2009).

The third factor is appropriate structure: organisational design should enable creativity, learning and interaction. The key issue is finding an appropriate balance between 'organic' and 'mechanistic' options for particular contingencies. In the public sector, sticking to thinking and acting through isolated organisational silos has time and again been identified as one of the main barriers of innovation (NAO, 2006, 2009; Eggers and O'Leary, 2009). According to Bason (2010), the past couple of decades have seen a surge in interest in 'joined-up', 'collaborative', or 'networked' governments as a way of responding to the need for increased coordination, and unity of policy development and service delivery (Pollitt, 2003; Eggers and Singh, 2009; Mulgan, 2009). Indeed, according to Stewart-Weeks (2010), the most influential people in public policy and management reform in the future may not be experts or people in ostensible leadership roles, but rather those who create new spaces and places for more complex, interactive and inclusive policy conversations.

Fourthly, long-term commitment to major projects: this is to emphasise that innovation projects should not be based on the sole criterion of short-term returns on investment, but on considerations of future market penetration and growth. While innovation, and especially major innovation, requires a long-term view and at least some of the firm's projects should be funded with 'patient' money (Edwards, 1983; Innovation Advisory Board, 1990; House of Lords, 1991). Indeed, the public sector budgeting

usually does not include money for exploratory and experimental, often pilot work. Even if this is available, policy structures (in silos) do not allow spreading these experiences across the government and the traditional budgeting process hinders it even more.

The fifth factor is corporate flexibility and responsiveness to change: due to increasing inflexibility in production, it is often seen as being too expensive to introduce product improvements (Abernathy and Utterback, 1978). As a result, products become obsolete. The introduction of Japanese-style flexible manufacturing systems could assist in overcoming this problem. Management should also recognise that technological innovations might require organisational and marketing innovations to facilitate their implementation; this is especially the case with radical innovations. Top management must accept this and the company should be sufficiently flexible to accommodate it. Indeed, there is little that bureaucrats hate more than innovation, especially innovation that produces better results than the old routines, as we quoted Frank Herbert in the beginning of this theses, and that improvements always make those at the top of the heap look inept (Herbert, 1984). This is perhaps the reason why creative and innovative people are more than often rejected by 'the system', or they leave the system, although bureaucratic, stability-focused and/or stagnate/status quo favourable people stay.

The sixth factor is top management acceptance of risk, innovation is inherently a high-risk undertaking and one of the few things we can be sure about is that there will be failures. Management must accept this, and not use one failure as an excuse for withdrawing from the innovation race altogether. In addition, attempts should be made to learn the lessons of failure through analysing unsuccessful projects, which many firms fail to do (Burgelman and Maidique, 1988). Potential failures can continue for a considerable period under their own momentum, with extremely high opportunity costs for more promising projects, and it is essential that top management accepts the responsibility for the termination of failing projects (Rothwell and Zegveld, 1985; Rothwell, 1992).

The seventh factor is the creation of an innovation-accepting, entrepreneurship-accommodating organisational culture: creative and innovatory aspects should be decoupled from the more mundane, routinised and bureaucratic aspects associated with making mature projects. 'Space' should be created in the firm to accommodate the activities of in-house entrepreneurs. An 'organic' style of management should be preferred to the 'mechanistic' approach. It is important to create a creative climate – positive approaches to creative ideas, supported by relevant rewards systems – a 'winners culture'. According to

Burns and Stalker (1961), successful innovation and technical progressiveness tend to be associated with an open, horizontal management style which emphasises consultation and participation rather than formal directives from above; a style that emphasises the flow of information not only upwards, but also downwards and outwards from the centre. Behn (1995) stresses that an innovative organisation engages everyone throughout the organisation in the task of developing and implementing new ways to reach organisational goals. Bason (2010), however, warns that public sector reform too often focuses on reorganisation. However, shifting the boxes (i.e. the organisation charts) alone does not truly address how people run government. It usually does not affect the process of how solutions are developed and how people interact. These aspects are too complex to visualise compared to boxes which are easily describable.

The eighth factor is organisational learning: it is important to have high levels of involvement within and outside the organisation in proactive experimentation, finding and solving problems, communication and sharing of experiences, and knowledge capture and dissemination. According to Lester and Piore (2006), productive societies, to sustain themselves, must be both efficient and creative. Mulgan (2009) supports an iterative, experimental, and adaptive view of how real governments work, with positive feedback reinforcing processes of change. This puts knowledge, which constantly evolves, at the heart of government – knowledge about why some schools systems work better than others, why some economies grow faster than others, or why some communities trust each other more than others.

The ninth success factor is internal integration and co-operation: the coupling model of the innovation process suggests that whether the impetus for new product development derives, it is important that all related departments are involved in project appraisal and project definition right from the start. With successful innovations, the emphasis is on interdisciplinary teams with the maximum sharing of information across functions. This ensures that customer needs remain the focus of R&D activity and that products are developed that can be efficiently and reliably manufactured. “We all are angels with only one wing; we can only fly while embracing each other”, perfectly said by the Italian author Luciano De Crescenzo.[18] Taking into account global challenges, raising competition between countries,

[18] Quoted in Bennis and Biederman (1996), pp. 27-8.

and new economic sectors (like healthcare), according to Bason (2010), collaboration around the creation and execution of government policies and services can thus take place across the public, private and third sector – or in a combination of all of them. Murray *et al.* (2009) argue that entire new business models are arising in the cross-section of the three sectors, essentially giving rise to a 'fourth' sector.

The tenth and last strategic factor coming from the innovation literature is consumer linkage: to attain enhanced performance and to elicit full value from customers, would-be innovators should take pains to identify and interact with leading-edge customers during and following new product development. According to Gardiner and Rothwell (1985: 161-169), "Tough customers equal good designs". In addition, if possible, products or services should be designed that are flexible with respect to user adaptation, thus enabling customers to make a significant contribution to product or service improvement (von Hippel and Finkelstein, 1978). In the public sector the consumer element means getting back to the basics. "Design thinking can remind public servants to ask the obvious: What's it like to check into a hospital, call the police or collect the dole?" (Tim Brown, CEO and President, IDEO in Design Council, 2009). On the other hand, it means also co-creation with citizens, other public institutions, business or voluntary sectors, as well as more than often both back and front-office integration within the government at large.

In addition to factors influencing the industrial innovation process and its success suggested by Rothwell, Cooper (1980) added three additional kinds of variables important for success which are still perfectly valid. Firstly, the nature of the product: specifically its uniqueness/superiority and the economic benefit it confers upon the customer. Secondly, the nature of the market: intensity of market need, market growth rate and market size. Thirdly, the achievement of technical and production synergies between the new product and existing products (the importance of cumulative know-how) – take Apple Inc. for example.

Literature of industrial innovation also stresses that success is people centred. On the one hand, it is a leadership issue. According to Terry (1986), there are currently at least 100 accepted academic definitions of leadership. Manz *et al.* (2000) believe that some leadership perspectives are more appropriate than others, at least for specific situations. In their context of leadership studies, they focus particularly on visionary, participative, and transactional leadership processes (see table 4.1). A

visionary/rhetorical view of leadership suggests a process in which various persuasive methods are employed to achieve a common view of reality in followers and to develop a vision that encompasses a common mission. A transactional view of leadership attempts to explain how the reciprocal process of influence between leaders and followers occurs over time. A participative leadership view involves processes in which part of the leadership function is passed on to followers.

Table 4.1 Integrative framework for conceptualising different leadership and influence processes

Leadership Perspective	Primary Direction of the Influence Process	Primary Type of Involvement
Rhetorical/visionary	Top-down	Identification
Transactional	Reciprocal	Compliance
Participative	Bottom-up	Internalisation

Source: Manz et al. (2000)

Ireland and Hitt (2005) stress the importance of strategic leadership, defining it as a person's ability to anticipate, envision, maintain flexibility, think strategically, and work with others to initiate changes that will create a viable future for the organisation. According to their view, there are six important components of effective strategic leadership in 21st century organisations: (1) determining the organisation's purpose or vision, (2) exploiting and maintaining core competences, (3) developing human capital, (4) sustaining an effective organisational culture, (5) emphasising ethical practices, and (6) establishing balanced organisational controls. In other words, leadership is a combination of task and context. The ultimate importance of strategic leadership also came out already from Child (1972), who said that strategic leaders, armed with substantial decision-making responsibilities, had the ability to influence significantly the direction of the firm and how it was to be managed and pursued.

Schumpeter (1947) brought in the term visionary entrepreneurship. "It is in most cases only a man or a few men who see the new possibility and are able to cope with the resistance and difficulties which action always meets with outside the rut of established practice," he said (p. 152). He also argued (Schumpeter, 1936, 1950) that the main agents of economic growth are the entrepreneurs who introduce new products, new methods of production, and other innovations that stimulate economic activity. Schumpeter (1936, 1950) described entrepreneurship as a process of 'creative destruction', in which the entrepreneur continually displaces or destroys existing products or methods of production with new ones. More modern authors stress the importance of corporate entrepreneurship (see Barringer *et al.*, 1999) and its relation to strategic management. Although Schumpeter's writings

focused primarily on the activities of the industrial entrepreneur, in many settings entrepreneurship is arguably a firm-level phenomenon (Covin and Slevin, 1991a, 1991b; Miller, 1983; Stevenson and Jarillo, 1990). The main assumption that underlies the notion of corporate entrepreneurship is that it is a behavioural phenomenon and all firms fall along a conceptual continuum that ranges from highly conservative to highly entrepreneurial. Entrepreneurial firms are risk-taking, innovative, and proactive. In contrast, conservative firms are risk-adverse, are less innovative, and adopt a more 'wait and see' posture. The position of a firm on this continuum is referred to as its entrepreneurial intensity (Barringer *et al*., 1999).

From the individual project leader's perspective, their existence is also crucial. According to Rubenstein *et al.* (1976), it appears that organisations do not make development projects successful, individuals do. For those who believe that organisational structure, control mechanisms, formal decision-making processes, delegation of authority and other formal aspects of a so-called well-run company are sufficient conditions for successful technological innovation, it can be said that this is not so. An overwhelming majority of the projects he studied indicated that certain individuals had played (often informal) roles in their initiation, progress and outcome. The literature calls these influential persons 'key individuals'. In terms of an innovation project, the key individuals could be divided into so-called 'project champions' and 'technological gatekeepers'.

The product champion is an individual who enthusiastically supports an innovation project and who is personally committed to it (Schon, 1963). He/she often plays the role of internal entrepreneur. He/she is particularly effective at maintaining impetus and support when the project encounters major difficulties. Project champions are especially effective in flat, flexible, integrated organisations. In hierarchical and bureaucratic organisations, his/her endeavours are often ineffective unless he has sufficient power and authority positively to influence the course of the project and to 'push' it across internal barriers to change (Rothwell *et al*., 1974). The presence of effective product champions is strongly associated with the innovation process (Rothwell, 1992).

The technological gatekeeper (Allen, 1986) is an effective transceiver of information. First, he/she attends conferences and seminars, has a comprehensive network of external contacts and is an avid reader of the primary literature. He/she thus plays an effective boundary-spanning role by bringing a considerable volume of relevant technical information into the firm. Secondly, he/she is an effective

internal communicator and disseminates information to others within the R&D system often, in larger laboratories, via a gatekeeper network. Their presence within a development project is associated with a superior technical outcome. Rothwell (1992) adds, in order for them to be effective the firm must value their activities by allowing them to participate in external activities and to disseminate their information internally. They must work in an environment which values information as an important commodity, and which rewards efficient information retrieval and dissemination.

In addition to attracting and retaining these key individuals, Warner (1994) stresses also the importance of skills and continued training for innovation. As said by Aldcroft (1992), the level of skills is normally a precondition for and often a determinant of economic performance and international competitiveness. According to Tidd *et al.* (2001), there is a need for continuing and stretching individual development – long-term commitment to education and training to ensure high levels of competence and the skills to learn effectively. Moreover, Rajan (1992) stresses that hybridisation process calls for more workers trained with both function-specific and general skills. Three kinds of generic competences have to be involved: (a) technical skills – specific to technology involved, (b) business skills – specific to the company's products, markets, etc., and (c) social skills – based in interpersonal abilities, team working skills, etc.

Innovation management theory discussed above is grounded overwhelmingly on innovation in the manufacturing industry and high technology sectors, which have been studied for many decades. However (according to Tidd and Hull, 2003 and OECD, 2000b), in the most advanced service economies such as the U.S. and UK, services create up to three-quarters of the wealth and 85 per cent of employment, and yet relatively little is known about managing innovation in this sector.[19] Indeed, many assert that industrial practices are equally applicable to managing innovation in services (e.g. Levitt, 1972; Fitzsimmons and Fitzsimmons, 2000; Meyer and DeTore, 2001), whereas others argue that services are fundamentally different (Smith, 1972; Bitran and Pedrosa, 1998; Gallouj, 1998). The relative misunderstanding around the service sectors is partly due to the fact that there are three myths historically related to services (see Gallouj, 2002): (1) the myth of an unproductive 'third' sector, (2) the myth of low productivity and low capital intensity in services, and (3) the myth of the service

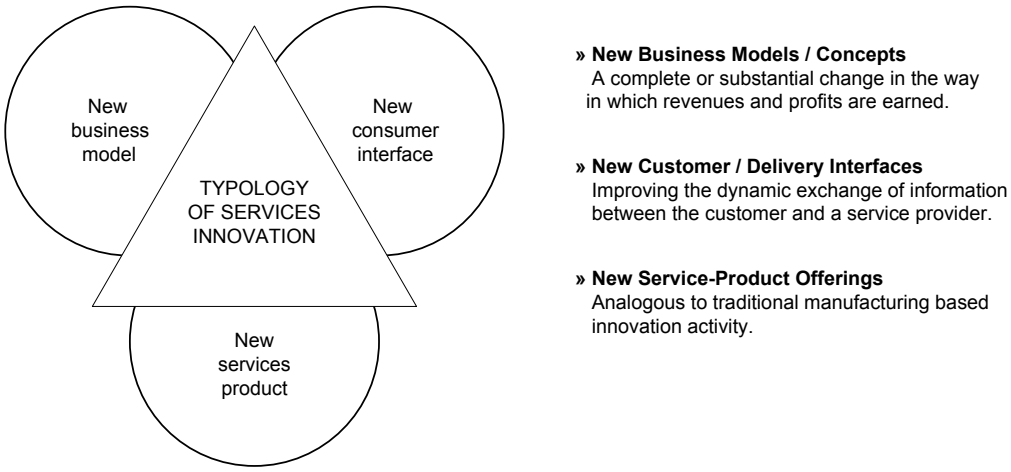
[19] The definition of services has also been subject to much discussion. For proposed definitions of services, see for example Hill, 1977; Riddle, 1986; and Metcalfe and Miles, 2000.

society as a society of 'servants'. The second reason is related to the fact that the criteria (as said by Smith, 1972), which were used by classical economists to distinguish services, are unsatisfactorily metaphysical, involving concepts such as 'intangibility', 'immediacy' and 'unstockability'. Despite the widespread recognition among economists of both the unsatisfactory nature of the indicators used to measure real output changes in the service sector and their downward bias in a number of cases, these factors are all too often neglected in presenting a picture of relative performance of sectors (Smith, 1972). Smith also proposed various measurable economic criteria which tend to distinguish services from manufacturing industries, such as a higher ratio of value added to total inputs (because services require less purchased raw material inputs), a longer degree of capital intensity, a different labour force composition (more female, part-time and self-employed workers) and different methods of measuring output. However, having defined these criteria, he conceded that none provide a clear-cut and unambiguous distinction, and for each there is significant overlap between manufacturing and service industries (Barras, 1984).

Indeed, still today, the concepts that underpin services innovation need to take into account a number of important features of services, such as: (a) services are intangible processes, (b) services are interactive, with several parties participating in the innovation process, (c) services are extremely diverse in nature, and (d) services innovation can operate at different levels – the economy, business strategy, operations and even individuals.

The technological dimension of services innovation tends to evolve around ICT developments, such as the installation of new computer hardware or the adoption of a customised software package. The non-technological dimension concerns the introduction of a new service concept, a new client interface or a new service delivery system. In order to operate these concepts from the policy perspective, Forfás (2006) developed a three-fold typology of services innovation – new business models/concepts, new customer/delivery interfaces, and new service/product offering (see figure 4.1). The typology assumes that each of these three types of services innovation can involve both technological and non-technological dimensions. There is a similar system also developed by van Ark (2006).

Figure 4.1 A typology of service innovation



Source: Forfás (2006)

In new business models or concepts, illustrated in figure 3.5, services businesses, partly due to the speed and immediacy with which they are able to address new opportunities, demonstrate a type of innovation that involves a complete or substantial change in the way in which revenues and profits are earned. Business model innovations can give a firm a strong and sustainable competitive advantage, however, companies must typically continuously rethink their organisational arrangements in order to accommodate new business models as value migrates within and between sectors and players in a sector.[20]

Innovation in the customer interface implies improving the dynamic exchange of information in services that occurs between the customer and a service provider, and which is a key element of any service function. The interface may be face-to-face, distant or entirely electronic and in all cases requires a heavily reliance on the staff employed, the technology that is mobilised and the timing of the exchanges. Technology may be a key enabler of such innovations although it is rarely a driver in its own right.[21]

New service or product offering-type of services innovation is the most analogous to traditional manufacturing based innovation activity. Service companies need to introduce new services in order to

[20] The advent of low cost or budget airlines in the 1990s was a typical innovation through the business model.
[21] The innovation of Internet banking is a good example of innovation in the customer interface.

respond to customer demand or competitor pressure as much as a manufacturing company. However, even here there are significant features that characterise services innovation. Potentially the most important of these is the relative speed with which new services can be brought to the customer compared to manufacturing products (Forfás, 2006).

In getting systematic about service innovations, Ganz (2006) suggests to follow five perspectives:

(1) Improve back stage provider or client productivity: applying six sigma, process re-engineering, and other transformation activities to the back stage. Functions of costs of activities, including costs of unwanted variance;
(2) Improve front stage scope: expanding the scope of front stage services – addressing more or better the custom requests of clients, as well as exploiting more of the unique capabilities to providers. Function of value of needs, including enabling new capabilities;
(3) Improve coordination: standardise processes and interactions. This can boost quality (compliance) and productivity. Function of scale, complexity, and uncertainty of the system;
(4) Improve dynamic evolution: continuously migrate provider-client pairs to higher value creation and capture points on an ongoing basis. Function of time;
(5) Improve capabilities of people, organisations, institutions or technologies to enter into higher value creation and capture configurations. Function of systems productivity capacity - innovating new capabilities (incremental, radical and super-radical innovations).

From the relative importance aspect of different factors influencing the innovation process in the services sector it is worth looking at Howells and Tether (2004), who analysed the findings from the Second European Community Innovation Survey (CIS-2), which covered innovative activities within service enterprises in 13 western European countries over the period of 1994-1996.[22] Among other things, the survey asked the firms to rank a variety of aims or objectives of innovation. Of these, improving service quality was the most widely recognised; 95 per cent of the innovating firms declared it relevant to their innovation activities, and over 60 per cent claimed it was 'very important'. Opening new markets (or increasing market share) and extending the service range were also widely recognised (each was relevant to about 85 per cent of the innovating firms, and 'very important' to about half). The high significance attached to these aims suggests a strong 'product' orientation to the innovation activities of the service firms, but as service outputs typically lack an independent physical existence (Gallouj and Weinstein, 1997), there is commonly a close nexus between the process (and organisation) of provision, and the nature of the services provided.

[22] The original research is provided in Tether *et al.* (2001) and Tether (2003).

Improving the internal business process and reducing labour costs were recognised as relevant by about 80 per cent and 70 per cent of the innovating firms respectively, and each of these was 'very important' to about 30 per cent. These aims are generally associated with 'process innovation', but these changes may impact directly on the nature of the services provided (Howells and Tether, 2004).

From this viewpoint, Barcet *et al.* (1987) identifies three models of innovation in services – professionals in partnership, managerial, and industrial. Sundbo and Gallouj (2000) have proposed complementing these models with three others: neo-industrial (which arises from dividing the industrial model in two), the entrepreneurial, and the craft model. The characteristics of these models are according to Djellal and Gallouj (2001) as follows:

The professionals in the partnership model characterises services with a large component of 'grey matter', which do not precisely sell products or services, but have competence and capacity for solving problems in the given fields of expertise (for instance, consultancy, research and engineering firms). In this model, there are no formalised innovation structures. 'Research' is, above all, individual, informal and pragmatic. This could be described as a 'bottom-bottom' or 'top-top' innovation model. In this respect, it has a number of advantages: it is flexible, capable of rapid response to market indicators, and of synergistically combining the individual thoughts of its members. However, depending on its individual make-up, it also has a number of disadvantages, including the risk of the innovation process remaining unfinished, the absence of a 'complete project', and the risk of a 'brain drain' linked to the turnover of 'professionals in partnership'.

The managerial model of innovation organisation is encountered in large audit and consultancy international networks. This model corresponds to the real existence of an R&D innovation policy, strategy or function within the firm, but the absence of a permanent innovation/R&D department. Research and, more precisely, the research of ideas is 'everybody's business', but development, which is a longer process, is the business of ad hoc project teams. The perspective favoured here is that of conceiving a 'product' which is as reproducible as possible. It cannot, however, be described as industrialisation of services.

The industrial model of innovation organisation is, according to Barcet *et al.* (1987) the least frequent in services. This model is, however, encountered in large firms specialising in standardised production

of operational services, dealing with materials as well as information, for example mass information processing firms, large contract cleaning or telesurveillance firms. This is a replica of the traditional industrial R&D model, which clearly separates the R&D department from production. In this type of firm, the production and delivery of services are separated. It is therefore possible to envisage a research and innovation department responsible for improving the 'products' to be delivered or developing new 'products'.

The traditional industrial model (in the strict sense) or Fordist model is described above. It is rare in services and it is becoming increasingly rare in manufacturing itself. It concerns large operational service firms. Specialised innovation departments may or may not exist, and maintain linear relationships (but no true feedback) with the other departments (linear model of innovation). There are often technical production departments and IT departments.

The neo-industrial model corresponds to certain evolutions underway in mass information services, which traditionally functioned according to the Fordist model, but which are today subject to great competition (banks, insurance companies, post office). In this model, innovation is produced by multiple sources (actors) who interact (these are unavoidable 'technical' interactions, whatever their effectiveness or quality may be). In the case of an insurance company, this would be, for example, the IT department, the different technical product departments, and possibly a 'think tank' resembling a genuine R&D department, and so on. Project groups involving members of different departments are favoured and multiplied with varying degrees of success.

The entrepreneurial model corresponds to the creation of service firms on the basis of a radical innovation. This involves small firms which have no R&D department, and whose main activity is selling the initial radical innovation. The appearance of IT services, repair services and so on, can be interpreted in these terms. Many service firms founded by university researchers often belong to this entrepreneurial model.

The craft model describes the innovation model corresponding to small firms involved in operational services (contract cleaning, caretaking/security, hotel/catering, and so on). These firms have no innovation strategy, nor do they have an R&D or IT department. However, innovation does occur through the model of improvement and learning processes.

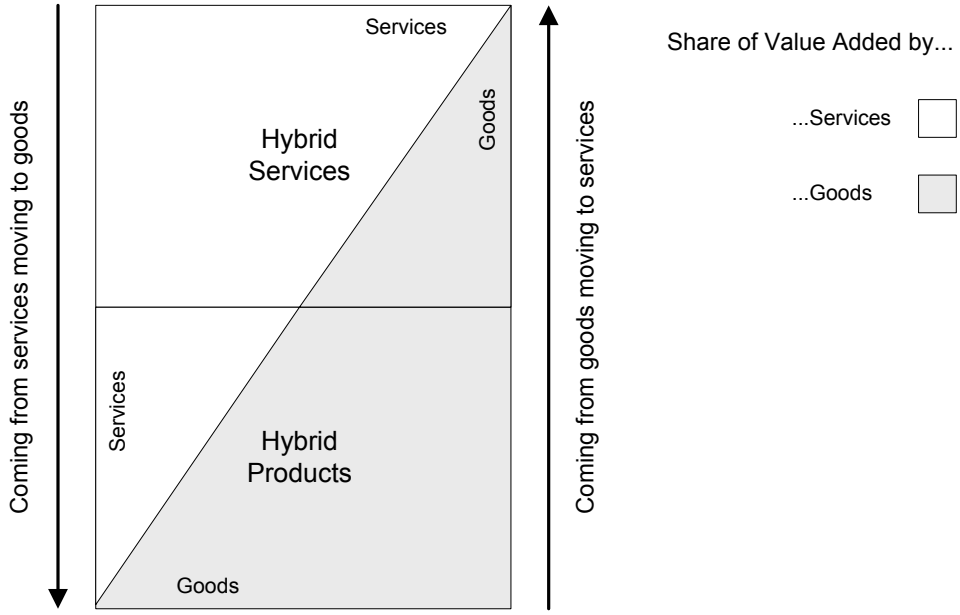
The transformation of modern services has developed a concept of hybrid services (or modern manufacturing hybrid product respectively). The distinction between goods and services is widely accepted as a fundamental criterion for classifying and analysing economic processes (as we also saw from the discussions above). However, the formal definition of the division between manufacturing and service industries generated considerable debate (Barras, 1984). The attributes describing 'typical services', and differing them from 'typical products', are their intangibility and perishability (i.e. unsold service time is 'lost' economic opportunity, that is, it cannot be regained), lack of transportability and homogeneity, their labour intensity, demand fluctuations and strong buyer involvement. However, the dichotomy between physical goods and intangible services should not be given too much credence. These are not discrete categories. Most business theorists see a continuum with pure service on one terminal point and pure commodity good on the other terminal point. Most products fall between these two extremes. For example, a restaurant provides a physical good (the food), but also provides services in the form of ambience, the setting and clearing of the table, etc. Moreover, some utilities delivering physical goods – like water utilities, which actually deliver water – are usually treated as services.

In today's information-driven world we cannot accept the historical Smith/Marx distinction between the productive and complicated work of manufacturing and the unproductive and simpler work of that characterises service activities (see earlier discussion). We should first accept that services can be even more capital intensive than manufacturing historically. Moreover, manufacturing work can be robust and simple, services can be highly knowledge and technology intensive. The phenomenon we also see is that value added in classical manufacturing is shifting from production to services (e.g. car manufacturing, servicing, and related financial services, i.e. financing car purchases). A product has become just factors surrounded by different personalised services. At the same time services, historically highly personalised, are moving towards standardisation (known more from scale intensive manufacturing industries).

According to Grönroos (2006), the competitive advantage in services lies mainly in flexibility and adaptability, while in physical products it is standardisation. The main weakness in services is inconsistency, while in physical products it is rigidity. To overcome this two dimensional problem,

Ganz (2006) suggest using sentences such as ‘industrial tertiarization’, ‘hybrid products’, and ‘hybrid services’ (see figure 4.2).

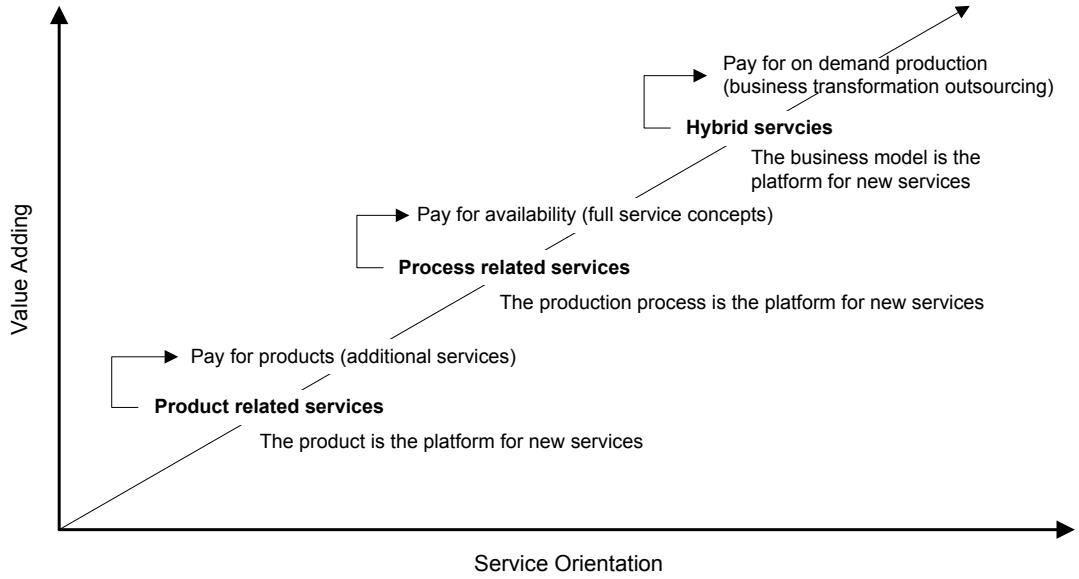
Figure 4.2 Hybrid products versus hybrid services



Source: Ganz (2006)

The ‘hybrid’ in product industries is determined by the ratio of services in their total value added. At the same time, hybrid service industries are determined by the ratio of products in their total value added. Hybrid products and services are dynamic as the ratio between product and service is continuously changing. We can talk about the hybrid ‘service’ if the services part of total value-added exceeds the part of products in a particular firm or industry, and conversely, hybrid ‘products’ are in firms and industries where the product part of total value added exceeds the part of services (see figure 4.3).

Figure 4.3 The history of industrial tertiarisation



Source: Ganz (2006)

From the management and economic perspective in services, Grönroos (2006) sees the goal as to get easily manageable product-like offerings that are easy to communicate to the market and easy to put a price on. He sees the ideal situation where services are like physical products with standardised offerings. However, this standardisation is resulting in threats to losing flexibility and adaptability, which should be managed instead of being eliminated. Grönroos suggests using the CSS Model to solve these problems. The model has three parts: (1) conceptualising, (2) systematising, and (3) servicing.

Conceptualise (first)

(1) What should be achieved for customers?
(2) How should it be done?

Conceptualise (then)

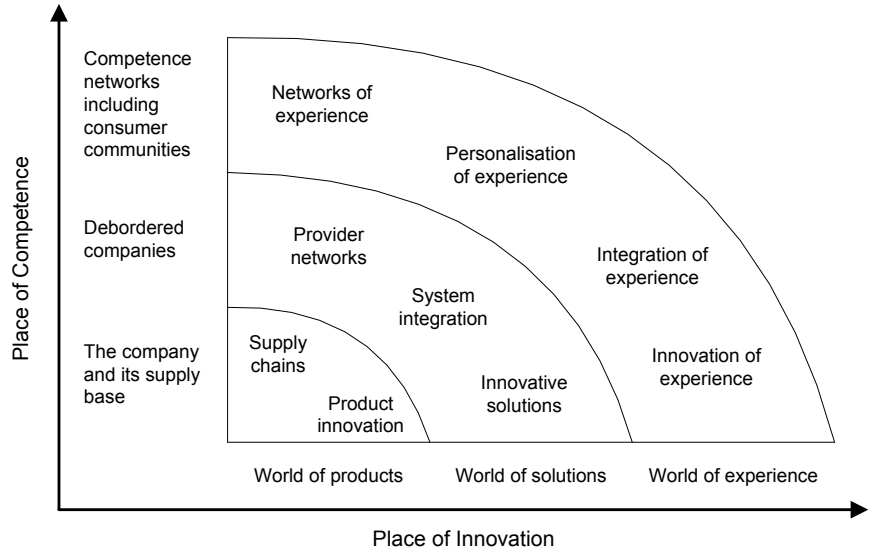
(3) What processes are needed?
(4) What resources should be used?
(5) How should these processes function in interactions with customers (and back office functions)?
(6) What are the limits for flexibility and adaptability?
(7) What support (physical, systems or leadership) is needed by the employees?

Servicing (finally)

(8) Make sure that every resource, process, interaction and customer touch-point functions in a way that supports customers' value-in-use, i.e. as services.

Finally, within the world with hybrid products and services, firms are not selling just (innovative) products or services to their customers, they have moved towards selling (innovative) solutions. Prahalad and Ramaswamy (2003) propose that the next practice of innovation must shift the focus away from products and services and onto experience environments – supported by a network of companies and consumer communities – to co-create unique value for individual customers. Moreover, instead of basing only on a firm's internal competences, they are participating in competence networks of knowledge, which include suppliers, customers, research institutions and universities, and even competitors, as we have also discussed earlier (see figure 4.4). These experience environments and networks are conceptually different from company-centric supply chains; experience networks comprise nonlinear, nonsequential interactions among companies, institutions and customer communities. The network creates an experience environment with which each customer has a unique interaction. The consumer actively co-creates his or her own personalised experience, which forms the basis for value to that customer. This model is probably evolving also in modern societies, where the public sector, the private sector and the civic society co-create national stories, intellectual and economic value, citizen experience and wellbeing.

Figure 4.4 The new competitive space for innovation



Source: Prahalad and Ramaswamy (2003)

In conclusion, we see that services are a diverse group of economic activities that include high technology, knowledge intensive sub-sectors, as well as labour-intensive, low skilled areas. In many aspects, service sectors exhibit marked differences from manufacturing – although these distinctions may be blurring (OECD, 2003). From the perspective of the present research, this is also true. Public services can be very knowledge intensive (e.g. healthcare) or relatively low skilled (e.g. simple postal services or technical workers). Indeed, there is still an on-going debate on whether service innovation can be analysed using the same concepts and tools as innovation in manufacturing (Drejer, 2002). Coombs and Miles (2000) distinguish between three different approaches for defining and studying innovation in services: (I) an assimilation approach, which treats services as similar to manufacturing, (II) a demarcation approach, which argues that service innovation is distinctively different from innovation in manufacturing, following dynamics and displaying features that require new theories and instruments, and (III) a synthesis approach, which suggests that service innovation brings to the forefront hitherto neglected elements of innovation that are of relevance for manufacturing and services. The current exploratory research tends to support the third approach, developing an appropriate combination of factors supporting and hampering the innovation process from the angle of the present research. Moreover, the literature review has shown as that there are relevant ideas and understandings of the innovation process in both the manufacturing/high-tech literature as well as in the services literature. Looking at the public sector innovation and modernisation literature (chapter 2), we also see that in majority of suggestions factors overlap between what we know in the innovation theory of industry and services.

From the leadership perspective, the literature stresses both the importance of strategic leadership as well as the influence of certain key individuals – project champions and technological gatekeepers. From the perspective of the present research, we can call it a strategic project leadership (SPL) approach (Shenhar, 2004). If the traditional project management is focused on efficiency, operational performance, and meeting time and budget goals, then SPL takes a more strategic approach. The principal argument is that today's organisations find that it is not enough to deal with strategy just at the executive level, and leave the operations to project manager. Project managers are required to grow and become team leaders, and they must handle all aspects of project leadership – strategic, operational, and human. For differences between traditional project management and strategic project leadership, see table 4.2.

Table 4.2 From project management to strategic project leadership

	Project management	**Strategic project leadership**
Basic paradigm	Project are a collection of activities that need to be executed on time, budget, and requirements	Projects are strategic organisational processes that are initiated to achieve business goals
Focus	Efficiency	Effectiveness and efficiency
Perspective	Operational	Strategic, operational, human
Manager's role	Getting the job done – in time, budget, specifications	Getting the business results winning in the market place
Project management style	One size fits all	Adaptive approach
Project definition	Project scope (SOW), what needs to be done	Product, competitive advantage, strategy, scope
Planning	Activity, schedule, budget	End results, success dimensions, activities
Project reviews	Progress, status, milestones, budget	Customer needs, strategy, success dimensions, status
Human side	Teams, conflict resolution	Leadership, vision, spirit, meaning, motivation

Source: Shenhar (2004)

From the perspective of the present research, the SPL model can also extend the 'mandate' of the process promotor (see the Troika-model in figure 2.3). This is important because the more cross-institutional and cross-functional public sector innovation projects get, the more different leadership abilities of the project champion count.

4.2. Learning view on the innovation process

The second layer of the conceptual framework of the present research is learning. Berry and Berry (1999: 171-7; 2007: 225-6) posit that governments emulate each other for one of four reasons: competition; learning; mandates; and public pressures. They argue that each of these variables will have a positive effect on the adoption of innovation.

W. Edwards Deming[23] has put it perfectly in saying that "learning is not compulsory … neither is survival." Knowledge plays a central role in innovation and production. According to Lundvall (1992), the fundamental resource in the modern economy is knowledge and, accordingly, the most important

[23] W. Edwards Deming was a U.S. business advisor and author (1900-1993); quoted in Bill Lucas (2005) *Discover Your Hidden Talents*, Strafford: Network Educational Press Ltd.

process is learning. The role of knowledge in the innovation process is strongly emphasised by the evolutionary literature (Nelson, 1995; Dosi, 1997; Metcalfe, 1998) as well as by the literature of the knowledge-based economy (Lundvall, 1993; Lundvall and Johnson, 1994; Cowan *et al.*, 2000). In these contributions, knowledge becomes highly idiosyncratic at the firm level and does not diffuse automatically and freely among firms. Of the key components of a high-performance organisation, a learning mode is the most important. According to Hale (1996), a learning organisation places a premium on innovation, risk taking, training, the right tools, communication, and measurement.

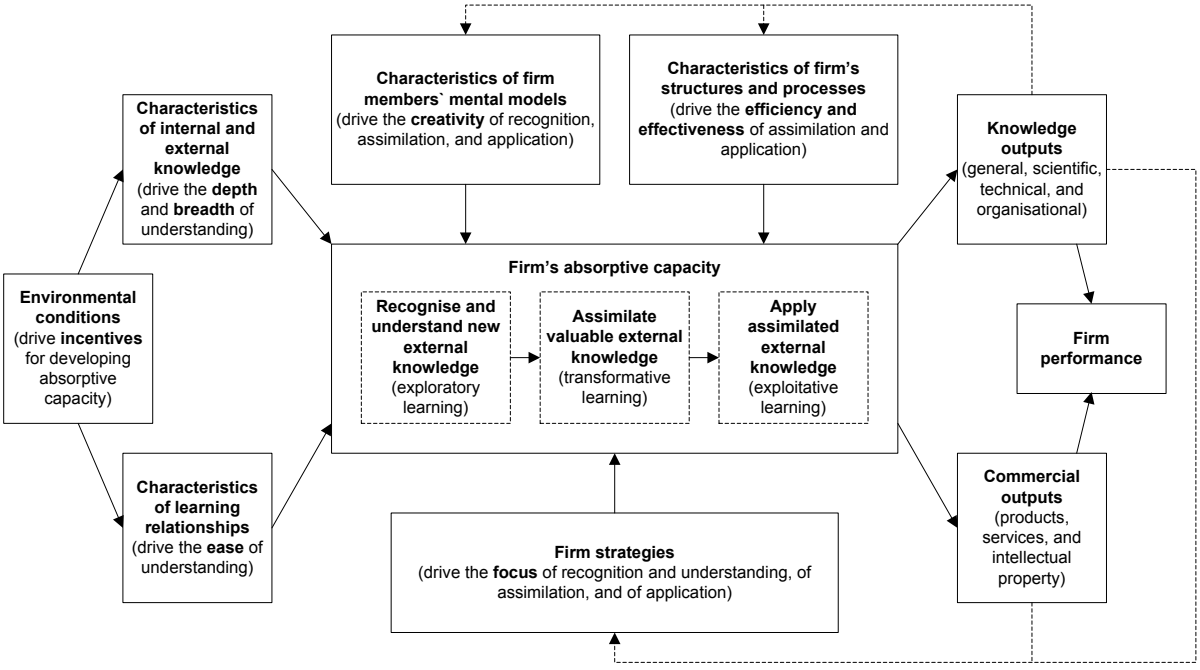
In the framework of organisational learning, there are two important perspectives. The first perspective is related external environment. It reflects to the educational level of a country, to appropriateness and qualitative level of public research institutions (in the particular industrial field), as well as to the general international competitiveness of a particular industry (suppliers, buyers, competitors). The other side is organisational, sometimes also called as absorptive capacity (see figure 4.5). Introduced by Wesley Cohen and Daniel Levinthal in a seminal paper in the Economic Journal, absorptive capacity refers to one of a firm's fundamental learning processes: its ability to identify, assimilate, and exploit knowledge from the environment. These three dimensions encompass not only the ability to imitate other firm's products and processes, but also the ability to exploit less commercially focused knowledge, such as scientific research. Developing and maintaining absorptive capacity is critical to a firm's long-term survival and success because absorptive capacity can reinforce, complement, or refocus the firm's knowledge base (Lane *et al*., 2006). From this perspective, the basics of the innovation theory should tell that organisations, both from the private as well as public sector, should be cleverer tomorrow, as they were yesterday. Quite simple. Indeed, too many organisations and nations are failing in this aspect. This is one of the fundamental reasons why many countries reach and stay in the so-called middle-income trap.[24]

[24] The middle-income trap is an economic development situation, where a country that attains a certain income (due to given advantages), will get stuck at that level. This is a failure in many countries to progress from growth fuelled by resources and cheap labour to growth driven by higher productivity. Typically, as wages, rise manufacturers of a particular country often find themselves unable to compete in export markets with lower-cost producers elsewhere; yet they still find themselves behind the advanced economies in higher-value products. The World Bank calls the middle-income range about US$1,000 to US$12,000 gross national income per person measured in 2010 money.

After conducting a detailed analysis of 289 absorptive capacity papers from 14 journals, Lane *et al.* (2006) suggest a more detailed definition of the construct (than Cohen and Levinthal, 1990). Absorptive capacity is a firm's ability to utilise externally held knowledge through three sequential processes:

- Recognising and understanding potentially valuable new knowledge outside the firm through exploratory learning;
- Assimilating valuable new knowledge through transformative learning;
- Using the assimilated knowledge to create new knowledge and commercial outputs through exploitative learning.

Figure 4.5 A model of absorptive capacity, its antecedents, and its outcomes



Source: Lane et al. (2006)

Absorptive capacity also overlaps with dynamic capability. However, according to Teece *et al.* (1997: 516), dynamic capability is more internally focused, and it is defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments." It thus reflects an organisation's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions.

Individuals and organisations generate possibilities for innovation by observing and reflecting on what others are doing and thinking, and by benchmarking themselves against good practices – wherever it might be found. Systemic scanning can identify promising ideas (Mulgan and Albury, 2003). In the public sector context, benchmarking and organisational learning is often tackled in the frame of policy learning (see chapter 2 for additional elaborations). Policy learning is not anything new; however, as said by Dolowitz and Marsh (2000), the technological advances (but also international organisations) have made it easier and faster for policy-makers to communicate with each other, and therefore the occurrences of policy transfer have increased.

In the present research, we believe that knowledge, institutionally accumulated and personal, has also been a major driving force behind the innovation process in the public sector. We strongly support the view that it is equally important to improve internal capabilities, as well as to learn externally – from the private sector, from other public sector institutions, from voluntary organisations, from different knowledge bodies (e.g. academic institutions), and from technology providers – locally, nationally and internationally. It is also important to learn from one's own mistakes or those of others, and to discover any available best practices appropriate to improve one's own processes, products and services. It is important to have close relationships with external partners, e.g. technology providers and user representatives.

From the innovation system (IS) perspective, there are three kinds of learning (Edquist, 2004):

(1) Innovation (in new products as well as processes) takes place mainly in firms and leads to the creation of 'structural capital', which is a knowledge related asset controlled by firms (as opposed to 'human capital'); it is a matter of organisational learning;
(2) Research and Development (R&D) is carried out in universities and public research organisations as well as in firms and leads to publicly available knowledge as well as knowledge owned by firms and other organisations and by individuals;
(3) Competence Building (e.g. training and education) which occurs in schools and universities (schooling, education) as well as in firms, and leads to the creation of 'human capital'. Since human capital is controlled by individuals, it is a matter of individual learning.

Learning organisations seek knowledge as the basis for competition in the twenty-first century. Mobilising and managing knowledge becomes a primary task and many of the recipes offered for achieving this depend upon mobilising a much higher level of participation in innovative problem-solving and on building such routines into the fabric of organisational life (Garvin, 1993; Leonard-Barton, 1995; Senge, 1990a). Innovation can be represented as a learning cycle, involving a process of

experiment, experience, reflection and consolidation. Managing the process is primarily a function of the creation of conditions under which learning opportunities emerge and are exploited. A key determinant of relative success or failure is the ability to manage this learning cycle in explicit form – for example, in the development of new products or the implementation of new process technology (Bowen, 1994; Hayes *et al.*, 1988; Maidique *et al.*, 1985). Organisations do not learn – it is the people within them who do. According to Garvin (1993) the following mechanisms are important to mobilise individual and shared learning (see also Tidd *et al*., 2001):

- Training and development of staff;
- Development of a formal learning process based on a problem-solving cycle;
- Monitoring and measurement;
- Documentation;
- Experiment;
- Display;
- Challenging existing practices;
- Use of different perspectives;
- Reflection – learning from the past.

Indeed, organisations seek to apply formal techniques and new information systems to help them make more effective use of their data resources (e.g. data mining), information assets (e.g. Enterprise Resource Systems) and expertise (e.g. groupware and collaborative systems) raising the specific issue of Knowledge Management (Miles, 2003). Organisational learning and an emphasis on human resources and intangible assets of all sorts become more of a central concern, with management tools being developed to help effective choice and improvement of systems.

The evolutionary literature has proposed that sectors and technologies differ greatly in terms of knowledge base and learning processes related to innovation (see for example Malerba, 2000b). First, the knowledge domain spans applications, users and demands of sectoral products. Second, the domain reflects the specific scientific and technological fields at the base of innovative activities in a sector (Dosi, 1988; Nelson and Rosenberg, 1993), as well as the sources of technological opportunities, which differ across sectors. Freeman (1982) and Rosenberg (1982) among others have shown that in some sectors opportunity conditions are related to major scientific breakthroughs in universities. In other sectors, opportunities to innovate may often come from advances in R&D, equipment and instrumentation. In still other sectors, external sources of knowledge in terms of suppliers or users may play a crucial role.

Indeed, not all external knowledge may be easily used and transformed into new artefacts. If external knowledge is easily accessible, transformable into new artefacts and exposed to many actors (such as customers and suppliers), then innovative entry may take place (Winter, 1984). On the contrary, if advanced integration capabilities are necessary (Cohen and Levinthal, 1989), the industry may be concentrated and formed of large established firms. Third, the domain relates to the degree of accessibility of knowledge (Malerba and Orsenigo, 2000), i.e. opportunities of gaining knowledge that are external to firms. Knowledge that is accessible may be internal or external to the sector. In both cases, greater accessibility of knowledge decreases industrial concentration. Another dimension states that knowledge may be also cumulative, i.e. the degree to which the generation of new knowledge builds upon current knowledge (Malerba, 2002b). He identifies three different sources of cumulativeness. The first source is learning processes and dynamic increasing returns at the technology level. The cognitive nature of learning processes and the past knowledge constrain current research, but also generate new questions and new knowledge. The second source is related to organisational capabilities. These capabilities are firm specific and can be improved only gradually over time. They implicitly define what a firm learns and what it can hope to achieve in the future. A third source is the feedbacks from the market, such as 'success-breeds-success' processes. Innovative success yields profits that can be reinvested in R&D, thereby increasing the probability to innovate again.

Indeed, even if there has been a growing culture of evaluation over the last two decades in most advanced economies, many public sector organisations are still essentially navigation blind when it comes to real-time, relevant management information on performance (Bason, 2010). Mainstream evaluation studies are usually heavily retrospective, and often arrive far too late to inform policy decisions in a meaningful way (Pollitt, 2003). Bason stresses that when it comes to their development efforts, public sector organisation "seem to spend 80 per cent of their energies on understanding the past and (at best) managing the present, and perhaps only 20 per cent of their efforts on systematically exploring future directions for better policies and services" (p. 19).

Therefore, the best way for somebody's development is adequate, timely and inspiring feedback. Alternatively, an important influence is to give somebody also a new and more ambitious task, which requires more effort and external knowledge accruing. And finally, a classical and formal schooling, carefully planned and executed, is also important.

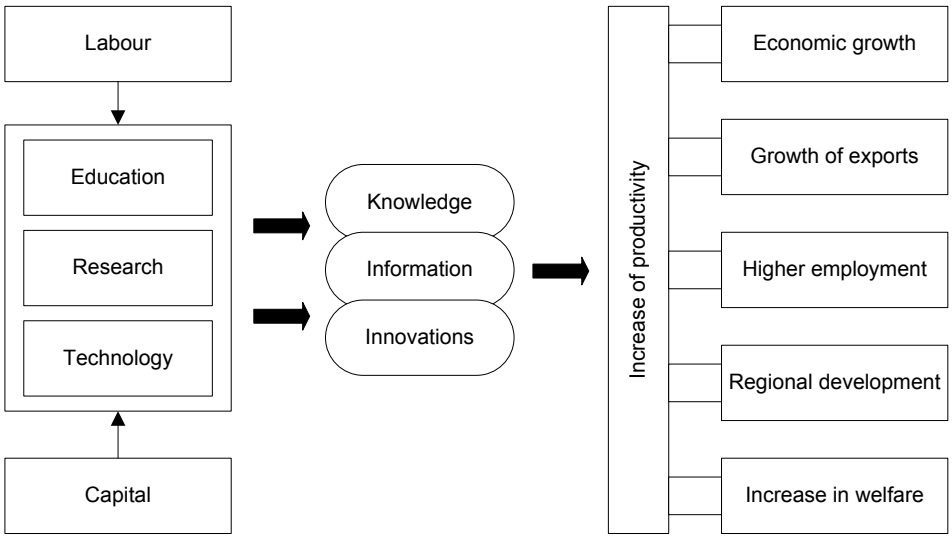
As seen, the key component of a high-performance organisation is a dynamic learning mode. A learning organisation places a premium on innovation, risk taking, training, the right tools, communication, and measurement (Hale, 1996). Senge (1990b: 7) quoted W. Edwards Deming's belief that we have been systematically destroying the very attributes needed by a high performance organisation: "People are born with intrinsic motivation, self-esteem, dignity, curiosity to learn, joy in learning. The forces of destruction begin with toddlers – a price for the best Halloween costume, grades in school, gold stars, and on up through the university. On the job, people, teams, divisions are ranked – reward for one at the top, punishing at the bottom. MBO, quotas, incentive pay, business plans … cause further loss, unknown and unknowable." According to Senge (1990b), primary institutions are oriented predominately towards controlling rather than learning, rewarding individuals for performing for others rather than for cultivating their natural curiosity and impulse to learn. Successful organisations encourage employee innovation as a way to produce measurable improvements in quality, quantity, and cost-effectiveness (Hale, 1996).

In The Fifth Discipline, Senge (1990a) identifies five new 'component technologies' that he claimed were gradually converting to learning organisations – systems thinking, personal mastery, mental models, building shared vision, and team learning.

Also, as seen in the previous sub-chapter, innovation and risk taking are inseparable in a learning organisation, which Spear (1993: 14) defines as "a place of truth-seeking and speaking without fear of reprisal or judgement … a place where curiosity reigns over knowing and where experimentation is welcome." Therefore, successful organisations permit employees to be creative and to take risks to find better ways to run a programme, deliver a service, or create a product. The structure of a learning organisation insulates them from the usual bureaucratic disapproval of risk taking or failure. Creating this environment is not possible, however, without the support of top leaders, as discussed in the previous sub-chapter.

From the economics perspective, in his 'New Growth Model', Kekkonen (2000, see figure 4.6) gives the central position to knowledge, information and innovations, which get inputs from education, research and technology, and give output via increased productivity to economic growth, growth of exports, higher employment, regional development and increase in welfare.

Figure 4.6 New Growth Model – Sources of Economic Growth



Source: Kekkonen (2006)

According to Bloch (2010), dissemination of innovations and learning activities are an important part of innovation in public sector institutions, and it also has direct policy relevance in a number of ways: how do public sector institutions encourage learning as an organisation? Moreover, how do they seek and access information from other actors. In terms of policy relevance, interest here stems both from a desire to increase learning, exchange of best practices, and so on across public institutions, and a strong interest in increasing the public sector's contribution to business sector growth and innovation: public-private interaction; procurement policies, etc.

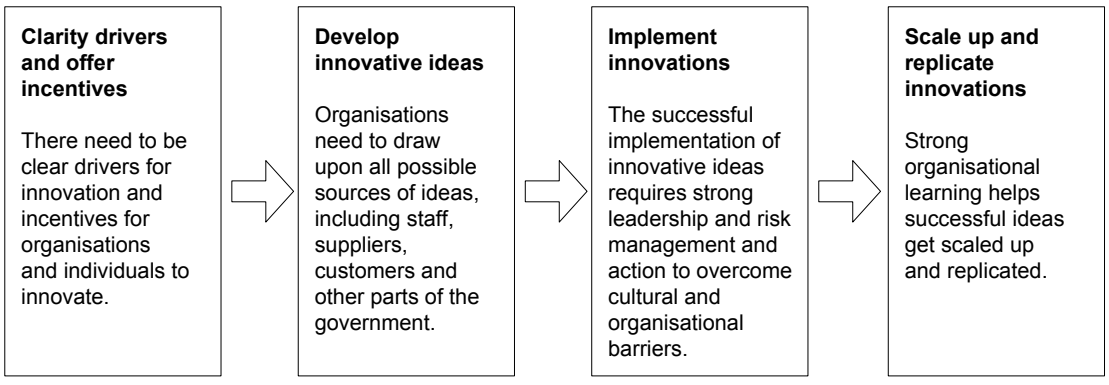
There are two directions at play here (e.g. in knowledge management): dissemination (outbound) and learning (inbound) (Bloch, 2010). Business innovation surveys generally focus on inbound diffusion and collaboration, though there are some examples here of surveying dissemination methods. The Audit Commission (2007) examined both directions, with more or less the same list of methods: special launch events, local seminars, sending guest speakers, regional networking meetings, own website, national seminars, journal articles, central website, mailshot, hardcopy newsletter, email newsletter. The Audit Office stresses that a further key benefit of innovation is the potential for its application beyond the authority where it originates. Many local public bodies face the same challenges and can support each other in identifying opportunities, sharing ideas and highlighting potential risks. In the private sector, the need for a distinctive position in the marketplace may inhibit knowledge transfer to

competitors (indeed, the concept of open innovation becomes more popular). However, in the public sector, improvement can be driven by collaboration and the transfer of knowledge between organisations.

Finally, according to Thenint (2010), if Europe seeks to be a dynamic and innovative knowledge-based economy, this is not a matter simply of transforming high-technology sectors. Public services are among the most knowledge-intensive and value added of all sectors, and thus obviously also need to be part of this mobilisation. Public services and public administration represent a significant part of the European socioeconomic activity, as discussed in chapter 1; Europe's public services account for between 40 per cent and 55 per cent of GDP and public services-related employment accounts for between one-quarter and one-third of the total EU working-age population, and public employment (civil servants) represents more than 15 per cent of the total employment in the EU.

Taking into account the large (and growing) proportion of public administration in Europe, the success of Europe is highly dependent on its ability to learn, to be creative, and surely more effective and efficient compared to the past. Moreover, as the National Audit Office (2009) rightly points out, the innovation lifecycle depends on more than just good ideas. Implementing successful innovations in the public sector depends upon clear drivers, strong incentives, good ideas, an absence of barriers to their implementation, and means for learning and replicating success (see figure 4.7). In addition, there is a reason and there are mechanisms for learning lessons from successful as well as failed projects, internal to the organisation and externally.

Figure 4.7 Implementing successful innovations in the public sector



Source: National Audit Office (2009)

According to the National Audit Office (2009) public departments should also encourage innovation from suppliers, by early engagement to find out what solutions suppliers have to offer to policy problems, and commissioning for outcomes rather than procuring predetermined products; from citizens, by explicitly involving them in service design, learning from customers' experience of services, and applying the Government Standard for Customer Service Excellence and measuring progress against it; and from other organisations, by encouraging greater openness and exchange of people and knowledge. It is also important to continuously improve learning processes as well as disseminate learning about successful innovation across government. And it is always wise testing and piloting when trying something new, and quickly identifying what is not working.

Finally, as pointed out by Walker *et al.* (2011), government leaders and managers learn from each other, and emulate governments' innovations that have been successful elsewhere in achieving goals or are popular with the voting public. Indeed the theory, and way it has been tested, does not indicate if these constructs apply to: (1) all innovations; (2) all localities that adopt innovations or just those that are more innovative; or (3) different types of innovation. Their study on local governments in the UK proved the fact. For example, high innovative localities seemed to be influenced by a different set of factors than low innovative ones are. The high innovative jurisdictions learned from professional associations, listened and responded to their primary governmental stakeholder (central government) and did not search for innovative ideas from other local authorities. In other words, learning and central government policies drove high innovative authorities (they look beyond their immediate environment for innovation), while low innovative authorities can be characterised as reacting: most of the heavy lifting in low innovative authorities was attributable to the internal determinants and responses to local pressures (Walker *et al.*, 2011).

Due to the importance of different types of learning in the public sector and governmental affairs, the survey of the present thesis will have a substantial amount of focus on this topic. We are especially trying to understand (empirically test) what the importance of learning in relation to concrete innovation projects is, as well as how the balance between different knowledge sources appears.

4.3. Technological view on the innovation process

The technological view is the third conceptual layer of this research as it is an important transformation facilitator in the public sector. Historically, governments, public administration and the military have played a vital role in creating and defining technologies of energy, materials, communication together with the emergent information society – usually through initiation of R&D projects and through the establishment of government as a potential customer for new technologies when no private market existed. This relates to all four technological developments – machine tabulation, electronic computers, microprocessors, and the Internet (for further elaboration, see Jorgensen and Klay, 2001). Although there is a substantial amount of policy focus on e-government and other forms of ICT-based innovation for the public sector, the literature of public administration (see also chapter 2) has until quite recently mostly ignored that historic role of governments in technology innovations.

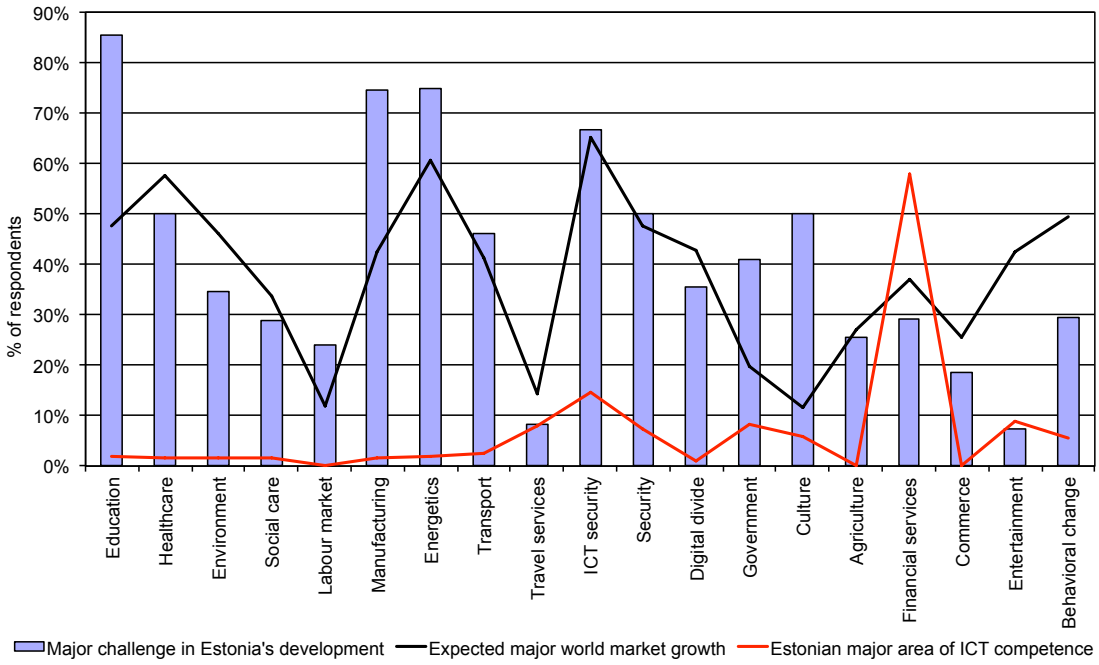
Despite that, there are different ways how government can boost innovation and government can also innovate itself, as discussed in the previous chapter. Indeed, much of today's innovations in public sector are linked to the Internet and communication technologies (broadband and high-speed technologies) leading the way to so-called information innovations (compared to former merely technological innovations). According to Magnus (2007), both technological and information innovations are creating greater efficiencies and opportunities, for example in healthcare and education, perhaps two key areas for the future as we confront the challenges of population ageing and globalisation.

While analysing the relative importance of ICT in boosting national wealth in Estonia, Tiits and Rebane (2009) found that state service improvements lie somewhere in the middle of the opportunity scale (see figure 3.12). Based on empirical research, areas where ICT influence was considered more important (in reflection to economic growth) were education, energy, industry, cyber-security, culture, and transport. On the other hand, areas where ICT influence was considered relatively lower than the government were digital divide, environment, performance patterns, financial services, social services, agriculture, labour market, retail trade, tourism, and entertainment.

What Tiits and Rebane also showed is that in addition to the relative importance of ICT use in a particular sector to economic growth, one should assess other factors (and their interdependency)

influencing ICT take-up in a particular sector (including government), such as resistance to change, availability of appropriate technological competences in that particular sector in a country, but also on local and global technology demand in these sectors (see figure 4.8). From that perspective, government shows one of the highest score in change resistance, together with education, social services, and the labour market. Therefore, when analysing technological innovation in public sector services, one should keep in mind that there are both objective and subjective factors influencing it, as well as demand conditions, which are different across countries.

Figure 4.8 Relative importance of ICT in boosting economic growth in Estonia



Source: Tiits and Rebane (2009)

From a strictly government perspective, it is known from more than a decade of research that most governments experience problems when implementing large technology, mostly information technology projects. Budgets are exceeded, deadlines are over-run and often the quality of new systems is far below the standards agreed when the project was undertaken. Moreover, governments are not alone in failing. Evidence suggests that private sector companies have similar problems. The Standish Group attracted a good deal of attention for its Chaos Report, a 1995 study of 8,400 IT projects in the public and private sectors in the United States. The study found that 31 per cent were cancelled before

completion; 53 per cent were completed, but over budget and with less than full functionality, and only 16 per cent of the projects were completed on time and within budget (Standish Group International, 1995; 1996). Due to its economic purposes (to gain IT consultancy business), the report slightly over-dramatised the IT problem (see Borins, 2001b), i.e. the assumption that a project not completed on time or within budget should be considered a failure is highly questionable. Indeed, the larger the development, the more likely it is that it will be unsuccessful (Goldfinch, 2007) and explanations for failure include (see Heeks, 1999) data inadequacies, technical problems, management/process/technical skill shortages, cultural clashes, political infighting and external environmental factors.

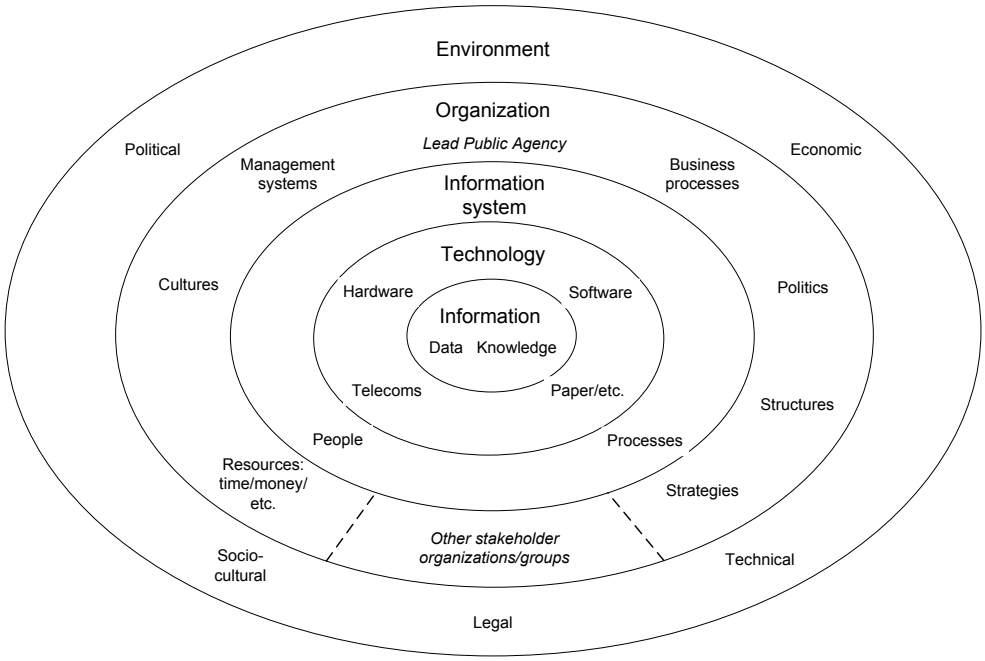
Therefore, large IT projects, similarly to other governmental innovations, can pose great political risks (as also discussed in previous chapter). Ministers and governments are held accountable for the failures and the accompanying waste of taxpayer money. These significant economic losses comprise not only outright waste in exceeded budgets and abandoned projects, but also – and equally important – lost opportunities for enhanced effectiveness and efficiency as wrote by OECD experts (OECD, 2001b). Also, according to United Nations (2003), from a less successful perspective (i.e. no public value created), one can talk about such developments that are (a) wasteful (engages resources but does not result in optimisation of government operations); (b) pointless [even if it optimises government operations, it has no (or only minimal) effect on the development objectives preferred by society].

Despite dangers and failures in history, most OECD member countries have formulated ambitious action plans for implementing e-government. The aim is to move service delivery to the World Wide Web, to enhance information to citizens and to make public sector workplaces smarter for the benefit of citizens, politicians and servants alike (OECD, 2001b). For example, the Danish e-government vision is systematically to use digital technologies to introduce new ways of thinking, transform organisations and work processes to improve the quality of service and efficiency (see Nielsen, 2006).

According to Heeks (2006), e-government systems (see figure 4.9) are information systems that are socio-technical: combining the technical and the human. Heeks stresses that most of the e-government initiatives fail due to their poor implementation and management. According to his earlier work (Heeks, 2001), there are seven dimensions necessary and sufficient to provide the understanding of e-government design-reality gaps: (1) information; (2) technology; (3) processes; (4) objectives and values; (5) staffing and skills; (6) management structures and skills; (7) other resources: time and

money. This is most probably true also in terms of e-government successes. However, it is not known how important it is compared to other possible drivers. Therefore, the present research analyses the social factor in technologically innovative public sector services in comparison to other possible innovation and success drivers.

Figure 4.9 Full model of e-government



Source: Heeks, 2006

Driven from past experiences, the OECD has concluded that unless governments learn to manage the risks connected with large public IT projects, these 'e-dreams' (i.e. ambiguous action plans for implementing e-government) could turn into global nightmares. "Governments must get the fundamentals of IT right if they want to harvest the huge potential of going online," states OECD (p. 1).

In order to get 'IT right', according to OECD (2001b), the following basics should be followed:

- Establish appropriate governance structures;
- Think small;
- Use known technologies;
- Identify and manage risk;

- Ensure compliance with best practices for project management;
- Hold business managers accountable;
- Recruit and retain talent;
- Prudently manage knowledge;
- Establish environments of trust with private vendors; and
- Involve end-users.

While internal obstacles (such as collaboration for seamless services) are important, external barriers need to be addressed on a whole of government basis in order to be overcome. Some of the internal and external barriers to e-government development can be the following (see also OECD 2003b, 2004 and Stauffacher, 2002):

Internal barriers:

- Lack of leadership – lack of both top- and project level leadership, visions and will;
- Centric values – agencies typically evaluate their IT systems according to how well they serve the agency's processes and needs – not how well they respond to citizens' needs;
- Technology leverage – in the 1990s, government agencies used IT to automate existing procedures, rather than to create more efficient and effective solutions;
- Island of automation – agencies too buy with systems that address internal needs, consequently, citizens have to search across multiple agencies to get service;
- Resistance to change – budgetary processes, agency cultures and fear of reorganisation create resistance to integrating work and sharing use of systems across several agencies.

External barriers:

- Legislative and regulatory barriers can impede the uptake of e-government – i.e. e-government processes can be adopted if they have the same standing as the equivalent paper processes, etc.;
- Budgetary frameworks can restrict e-government initiatives – existing budgetary arrangements fund rather departments than cross-organisational, government-wide projects;
- The adoption of e-government solutions can lag behind technological change – governments face risks in fostering e-government while uncertainties exist regarding to technological change.
- The digital divide impedes the benefits of e-government – this can nullify the advantages of online access that are impossible to replace offline, such as the drawing together of information.

In conclusion, even if most governments have experienced problems when implementing large technology projects, the reasons have been different – mainly internal to the organisation but also external. Therefore, both technology adoption and technological innovation are highly risky businesses, which should be properly planned and executed, managed and monitored. Acquiring external knowledge and systematically developing internal capabilities are the cornerstones in this process.

From another angle, e-government is more about government than ‘e’ (electronic) (OECD, 2003b). It enables better policy outcomes, higher quality services and greater engagement of citizens. E-government initiatives refocus attention on a number of issues: how to collaborate more effectively across agencies to address complex, shared problems; how to enhance customer focus; and how to build relationships with private sector partners. Based on that, e-government can be defined as the use of ICTs, particularly the Internet, as a tool to achieve better government (OECD, 2004a). The United Nations defines e-government as a government that applies ICTs to transform its internal and external relationships to optimise government service delivery, constituency participation and governance (United Nations, 2003; Gartner Group, 2000). E-government is the government’s use of technology, particularly web-based Internet applications, to enhance the access to and delivery of government information and services to citizens, business partners, and employees, other agencies, and government agencies (Stowers, 2005). E-government improves democracy – e-democracy is a natural part of the e-government strategy, putting the citizen in the centre of the government. E-government is justified if it enhances the capacity of public administration to increase the supply of public value, i.e. the things that people want. Public value refers to the value created by government through the provision of services, the passing of laws and regulations and other actions. The key things that people value tend to fall into three categories: outcomes, services and trust (United Nations, 2003).

There are several ways how ‘e’ can improve the government (see OECD, 2003c, for example). E-government can improve efficiency and effectiveness; it can improve and personalise services; it might help to achieve specific policy outcomes and contribute to economic policy objectives; it can be a major contributor to reform, as well as helping in building trust between governments and citizens. However, according to Püüa (2006), technology brings measurable value only if it eliminates a factor, which significantly constrains the improvement of (current) results. Technology adds value only if its price is smaller than the value it creates.

Hamel (2000) stresses that ‘e’ without ‘i’, that is, ‘e’ without real innovation, is not very much. First, he does not think that there is such thing as an ‘e-business model’ in a pure sense and that ‘e’ is just another technology that does a variety of things. And allowing to distribute digital content extraordinary efficiently, it allows you to answer customer queries more efficiently, and it allows you to remove layers of bureaucracy and process in large organisations. Therefore, ‘e’ can support one’s

core business, not replace it. Hamel also stresses that created efficiency may not end up on the bottom line (i.e. profits) because many companies have very similar e-strategies, they are based on similar platforms (e.g. SAP), and they are supported by the same handful of IT consultants (e.g. IBM Global Services or PWC). Hamel suggests that any executive needs to ask his/her CIO in a large company what they are doing to build a unique industry competitive advantage? Another reason for 'e' not raising but rather diminishing productivity and efficiency is that in the same way that the Internet is helping many companies to reduce costs and gain efficiency, it is also giving customers a lot more power in the overall purchasing equation. Although indirectly, this is also true in the public sector.

Literature (United Nations, 2003; OECD, 2003b, 2004) proposes many principles of successful e-government, which can be categorised as follows: (I) Policy: (a) priority development and government involvement, (b) political and administrative will, leadership and long-term political commitment. (II) Economy: (a) efficiency and effectiveness as key success criteria of government involvement, (b) financing, ability of initial funding and understood costs of the project, (c) accountability, (d) monitoring and evaluation, (e) perception of added value. (III) Framework conditions: (a) co-ordination within and between government agencies, (b) integration to broader policy and service delivery goals, (c) legal framework, (d) ICT infrastructure, (e) partnerships, (f) inter-agency collaboration, (g) skills and culture of the civil service, (h) plans for development of human capital and technical infrastructure. (IV) User: (a) access and skills of users, (b) user choice, (c) public/user engagement, (d) privacy and security.

Finally, as said by OECD (2003b), in the public sector, the e-government phenomenon has challenged the existing ways of working. ICT needs to be incorporated into a package of modernisation, organisational change and related reforms (including greater teamwork, flexibility in working agreements and remuneration and enhanced knowledge management practices) that challenge public governance frameworks. There will not be a single model of an e-government enabled organisation. E-government co-ordinators should use ICTs as a tool to facilitate change, and should not attempt to restructure public administration around current technology.

E-government can be classified in several ways. As discussed earlier, public services, as well as e-government services, can be differentiated by their activity, field and target sector. According to Stowers (2005), there are nine primary types of e-government activity: (1) information access and

delivery, (2) document access and download, (3) interactive information access (online databases), (4) communication with officials, (5) paperless document filing (online forms), (6) interactive discussions, (7) online mapping (e.g. GIS applications), (8) e-commerce applications, and (9) multimedia – streaming and playback.

Willcocks and Harrow (1992) separate so-called fields of government, in the present time and context, as well as e-government. These are personal and environmental health services personal social services, probation and after-care services, police services, prison services, social security services, employment and training services, and housing, recreation, transport and education authorities/services. According to W'O Okut-Uma (2001), there are also e-services related to passports/citizenship, defence, power and water utility, inland revenue, etc. We see that these classifications are quite incoherent and therefore suggest that everyone studying public or e-government services should develop his/her own unique framework that allows both appropriate representation and comparability of cases/results.

E-government services can be distinguished also according to their target sectors. Although e-government encompasses a wide range of activities and actors, three distinct sectors can be identified (see for example Bonham *et al*., 2003; Seifert, 2003). These include government-to-government services (G2G); government-to-business services (G2B); and government-to-citizen services (G2C). Some observers also indicate a fourth sector, government to employee (G2E). However, since G2E operations are intra-agency activities, they can be considered a subset of the G2G sector.

In many respects, the government-to-government (G2G) sector represents the backbone of e-government. Some observers suggest that governments (federal, state, local) must enhance and update their own internal systems and procedures before electronic transactions with businesses and citizens can be successful (Atkinson *et al.*, 2000). G2G e-government involves sharing data and conducting electronic exchanges between government actors. This involves both intra- and inter-agency exchanges at the federal level, as well as exchanges between the federal, state and local levels (Seifert, 2003). There are a number of forces motivating G2G e-government initiatives, for example legislation.

Government-to-business (G2B) initiatives receive a significant amount of attention, in part because of the high enthusiasm of the business sector and the potential for reducing costs through improved procurement practices and increased competition (Gilbert, 2001). G2B initiatives also link to different

B2G reporting areas (including statistics, taxes, etc.), where the interest in simple, faster, cheaper and more automated communication is mutual.

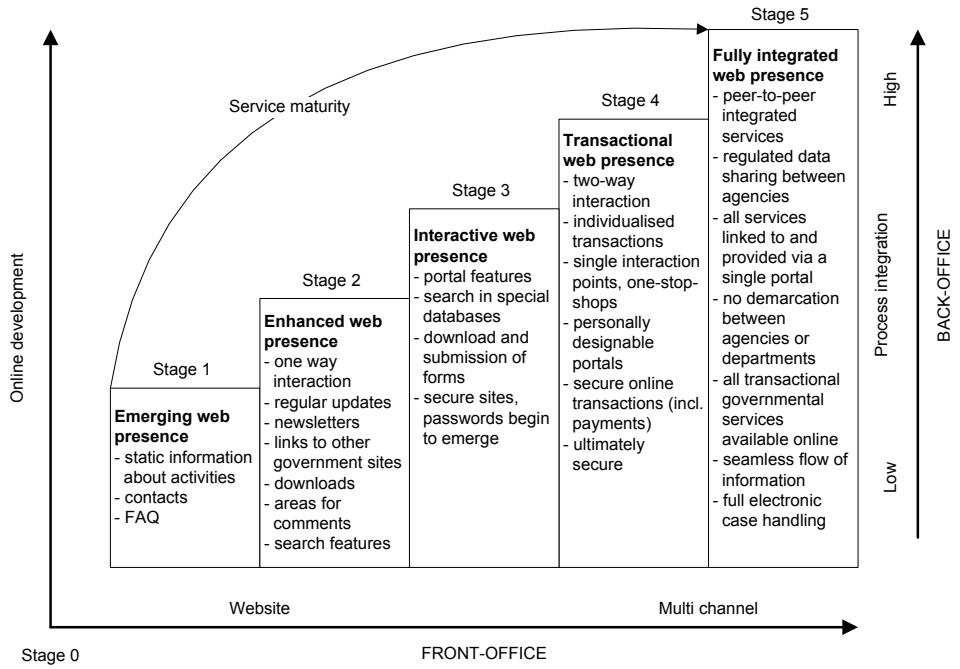
Government-to-citizen (G2C) initiatives are designed to facilitate citizen interaction with government, which is what some observers perceive to be the primary goal of e-government. These initiatives attempt to make transactions, such as renewing licences and certifications, paying taxes, and applying for benefits, less time-consuming and easier to carry out (Seifert, 2003). It is also suggested suggest that one of the goals of implementing these initiatives should be to create a 'one-stop-shopping' site where citizens can carry out a variety of tasks, especially those that involve multiple agencies, without requiring the citizen to initiate contacts with each agency individually (Hasson, 2001; Matthews, 2000).

According to Rose (2005), the supply and demand of Internet services (Internet capital) is determined by a country's collective and individual capital. He believes that while some features of Internet capital are of pervasive significance for society, such as its national income, others are especially relevant to the Internet, such as the nationwide penetration of telecommunication facilities. Collective national capital is essential for the supply of Internet infrastructure. Low-income countries have been unable to afford heavy investment in telecommunication facilities, and governments that censor the print and broadcasting media hesitate to promote a new medium that opponents can use to open up political debate. Local capital is a precondition for supplying Internet access to community. In many countries, there are great differences between urban and rural areas in the supply of libraries, secondary schools and other facilities where Internet access may be made publicly available. In the absence of Internet infrastructure, individuals do not have a choice about going online, for the means of doing so are not at hand. This is the context in which most governments operate and in which the majority of the world's population today lives.

The normative literature agrees that there are different stages in e-government provision and governments are going through a number of stages before reaching maturity (Irani, 2006). There are different frameworks developed to describe or assess the stages of e-government development (for example Gartner Group, 2000; Howard, 2001; Chandler *et al.*, 2002; Layne *et al.*, 2001; United Nations, 2002; Silcock, 2001; Moon, 2002; Rambøll, 2004; Capgemini, 2006; Windley, 2002; Atallah, 2001; OECD 2004a; UNO, 2003; UNPAN, 2006). These frameworks tend to have three to five stages (see figure 4.10), starting from the simple online presence of an organisation (i.e. posting of basic

information) up to seamless or fully integrated web presence of government services (i.e. integrated services, data sharing, common platforms, e-voting).

Figure 4.10 Integrated framework of the stages of e-government development



Source: Composed by the author (based on the literature, including Capgemini 2006, 2007; Layne and Lee, 2001)

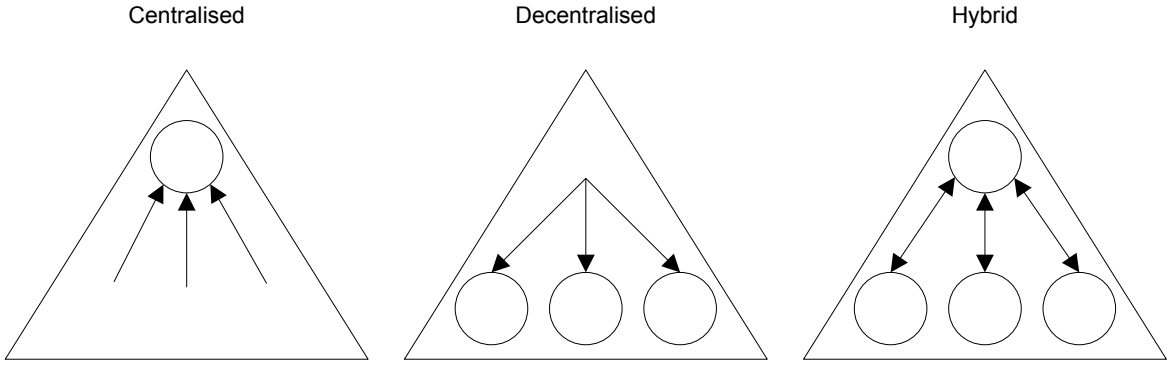
The highest order of evolution for an e-government initiative is sometimes also called 'transformation'. There are, indeed, very few examples of this type of initiative, in part due to administrative, technical, and fiscal constraints (Seifert, 2003). One of the distinctions of these initiatives is that they facilitate the seamless flow of informative and collaborative decision-making between federal, state, local, public, and private partners. In other words, transformative e-government initiatives often seek to remove the organisational barriers that promote agency-centric solutions and, instead, promote customer-centric solutions (Seifert, 2003). Some advocates suggest that, at its most advanced level, e-government could potentially reorganise, combine, and/or eliminate existing agencies and replace them with virtual organisations (Baum *et al.*, 2000).

From the management perspective, e-government is a tool to achieve better government and therefore it offers potential solutions to leaders across the whole of government: IT managers, programme

managers, agency heads, government-wide e-government planners and co-ordinators, and politicians all have a role to play (OECD, 2003c). Strong leadership can speed up the process of e-government implementation, promote co-ordination within and among agencies and help reinforce good governance objectives. Leaders are well placed to make the case for e-government and articulate such benefits to other stakeholders. Leaders drive e-government planning by setting a broad vision (OECD, 2003c). According to Heeks (1998), public servants/services should be feasible and accountable to politicians (political accountability), to finance providers (financial accountability), to citizens/clients (public accountability), to professional peers (professional accountability), to the judiciary (legal accountability), and to senior management (internal/managerial accountability).

Heeks (2006) distinguishes centralised, decentralised, and hybrid models of e-government management (see figure 4.11). In 'centralised, top-down approaches', decisions are taken at the most senior or central level – this model may be efficient but can be unworkable and inefficient, he says. In 'decentralised approaches', decisions are taken at some level lower than the most senior level, typically by individual work units within the organisation or even by individual staff. This model may match organisational realities but be high cost and/or low scope. In 'hybrid approaches', decisions are taken both senior and lower levels, separately or in an integrated manner – this model may be effective by compromising between central and local or by dividing responsibilities between central and local. Nevertheless, Heeks concludes that, ultimately, resources, values and politics determine how e-government is managed in particular organisations.

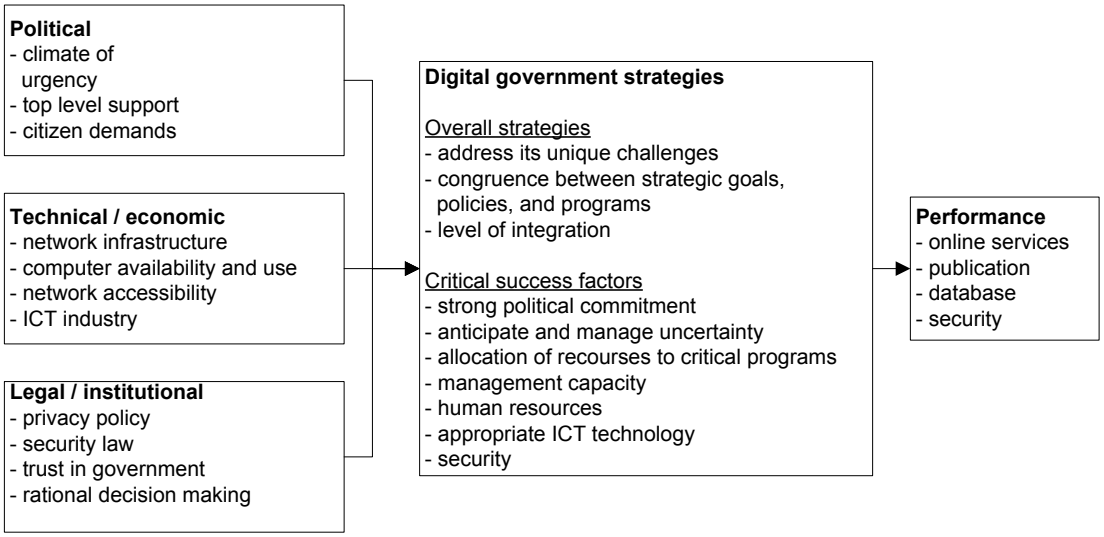
Figure 4.11 Different approaches of E-government systems responsibilities



Source: Heeks (2006)

Chen *et al.*, (2005) suggest to organise the framework of digital government development into three sections (see figure 4.12). These insights are organised into digital government strategies (centre), environmental conditions (left), and performance results (right). Each group of factors is grounded in either the bodies of literature or some empirical evidence. Four principles govern the development of the framework. Fist, a good strategic plan needs to address the unique challenges posed by environmental circumstances facing a national digital government effort. What matters is the extent to which a strategy addresses its environmental conditions rather than setting ambitious goals. Second, there exists a set of principles and success factors, which, if done correctly, will increase the likelihood of success. Third, the framework acknowledges the evolutionary nature of digital government efforts. A strategy also needs to adapt to any possible shape the environment that a national government is in. Lastly, performance of digital government is an important element of the framework to trace the effect of strategies on outcome.

Figure 4.12 A Conceptual framework for the development of a national digital government strategy



Source: Chen et al. (2005)

According to Püüa (2006), from the citizen's perspective, the common claims towards the state tend to be the following: (a) bureaucrats often ask for additional documents, (b) sometimes bureaucrats are 'too slow', (c) sometimes they have to visit the bureaucrat several times in order to receive the public good/service, (d) they have to visit the bureaucrat for 'every simple thing', and (e) they can meet the bureaucrat only during the working hours (8 a.m. – 5 p.m.). At the same time, from the bureaucrats'

perspective, citizens often ask for service/public goods they have no legal right to receive, citizens often do not bring all the documents with them to receive the service/public good, citizens do not follow the 'official procedures' to receive the service/public good, etc.

Therefore, digital government is a tool for bringing government services closer to people. However, in a society and economy that is increasingly driven by technological innovations, people have to deal with a difficult trade-off between convenience and/or the efficiency that a technological innovation brings and the changes in the societal context that it imposes (United Nations, 2003). E-government is also seen as a powerful tool for enhancing citizen engagement in policy-making. Indeed, the barriers of greater online citizen engagement in policy-making are cultural, organisational and constitutional, not technological. Overcoming these challenges will require greater efforts to raise awareness and capacity both within governments and among citizens (OECD, 2003d). According to Eggers (2005), there are six ways technology can transform government-citizen relationships:

1. Reorganise government around citizen needs;
2. Make choice-based service delivery more viable;
3. Provide neutral information to help citizens make important choices;
4. Customise services and interactions between government and citizens;
5. Allow citizens to complete government transactions anywhere, anytime, from a variety of devices;
6. Reduce the cost of government.

Eggers (2005) predicts a massive power shift from governments to citizens, as the latter no longer have to rely on bureaucrats to decide what information is needed and what must be done with it. His point of entry to this transformation begins with public sector portals. For years there have been discussions about what government would look like in a perfect world. "There wouldn't be dozens of different federal job-training programmes (in the U.S.) where you would get five different answers to your question depending on which bureaucrat you talk to. You wouldn't be endlessly transferred from one department to another," Eggers argues (p. 17). Around the world, public sector portals have helped reshape, reorganise, and re-create the governments that built them. Alan Dobrin [the Chief Information Officer (CIO) of the city of New York] has argued that "In the world of bricks and mortars, enacting this kind of change would take forty years of fighting interest groups, however, in cyberspace you just do it" (in Eggers 2005: 17) Therefore, today many government websites have been transformed from

clumsy digital brochures into full-service virtual clearinghouses that guide visitors to all manner of information and public services.

In conclusion, there are also several dilemmas related to e-government. For example, the mere existence of e-government says nothing particular about the quality of life in the society (United Nations, 2003). At the same time, if a public administration does cross the 'digital divide', it opens endless opportunities that are particularly inaccessible by any other means. Different authors also believe that government has been especially slow to realise the full potential of digital technology (e.g. Eggers, 2005). This should come as no surprise to anyone given bureaucracy's inherent resistance to change and the lack of a profit motive in the public sector (see also discussions in the second chapter). Governments will never truly realise the transformative benefits until government systems, ways of delivering services, and bureaucratic structures are rethought and redesigned to reflect the realities of the Information Age. Moreover, the e-government development should not be too technocratic – there should be a balance between technological orientation, administrative orientation and user orientation (Tat-Kei Ho, 2002). As said by Texas CIO Carolyn Purcell, e-government transformation will indeed be a matter of will and government leaders have to have the will to revamp their systems. Indeed, the e-government planning itself should be seen as an in-depth and group activity. Moreover, as suggested by Heeks (2006), the 'hybrid' approach should be preferred instead of only centralised e-government strategic planning or fully decentralised local approach. Therefore, "e-government planning should be seen as incremental, as participative, as limited in scope: guiding more than dictating," says Heeks (p. 65). According to Nilsson and Ranerup (2002: 313), within hybrid approaches, a 'modified approach' would encompass the more flexible notion of strategy as guidelines rather than blueprint, "allowing for revisions based on experiences from on-going process of change." Compared to e-government planning with a strong strategic component, the hybrid approach would involve more active participation of users and local units in the formulation of strategy (Bishop, 2001) – it also balances the needs of internal and external stakeholders in setting priorities.

These different discussions motivate (according to Bloch, 2010) the examination of a number of key issues in the development of definitions and indicators for public sector development research, for example:

- How is innovation conceptualised?

- Is it possible to measure innovation expenditures?
- How is the role of ICT important for innovation, and how can this be characterised?
- Is knowledge about innovation culture and how organisations innovate important for users? What key elements of their innovation activities can organisations themselves identify?
- What do users need to know about external interactions? How do organisations view the importance of external activities for their innovation?
- How can data on drivers and barriers to innovation be used? What do organisations themselves identify as most important for them?
- How can innovation in the public sector be related to that in the business sector?
- How does the heterogeneity of public sector organisations affect its development measurement?

As the above-mentioned are more general innovation indicators for the public sector, from the pure ICT perspective, Dunleavy *et al.* (2008) proposes the following set of ICT-specific indicators: (a) share ICT expenditures, (b) share ICT expenditure spent on website, (c) average age of ICT equipment, (d) replacement time for PCs/computers, (e) development and management of ICT services done in-house, (f) intranet system, (g) percentage services that can be requested online, and (h) percentage services that can be delivered online. However, what Dunleavy *et al.* also stress is that these indicators are fairly standard, raising the question whether they are really able to capture the degree of ICT-based innovation.

Finally, beyond the strict technological aspect of innovation, IT should be considered more as an innovation driver rather than an innovation in itself (Thenint, 2010). Therefore, this research is positioned in between the concrete cases of government innovations (mostly e-services) and related organisational and external factors influencing the innovation process.

4.4. Systemic view on the innovation process

The systemic view is the final, fourth perspective of the research framework of the present study. Researchers argue that innovation takes place and/or diffuses in a system consisting of individuals, firms and institutions and within a certain cultural and regulatory framework. Rogers (1995: 5) defines diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social system”.

It is nowadays claimed that instead of scientific institutions, most innovation processes start within organisations trying to solve certain problems. Through this learning process, the organisation will

make use of various sources of competences and knowledge in the innovation system, being those customers, suppliers, consultancies, patents, or various research institutions. Systems also create stronger networks between people, ideas and opportunities. From the literature, we know different frameworks are called 'systems'. Although the majority of the systemic concepts of innovation and/or business process have been developed for the private sector, we will discuss them here in order to facilitate the development of a systemic framework for the present research in public sector services. In more recent studies, researchers argue vigorously (e.g. Bugge *et al.*, 2010) that when trying to understand how innovation takes place in the public sector this should not be done without seeing this in relation to the wider innovation system in which it is part. Bason (2010) stresses also the necessity seeing things in the innovation ecosystem context – an explicit, systemic approach to strengthening the awareness, competencies and ways of working that can power innovation within the public service. Within this ecosystem, public sector innovation happens in an on-going tension between constraining and enabling factors across four parts of the ecosystem: consciousness (awareness), capacity (structure), co-creation (process) and courage (leadership).

The broadest possible definition of a system is that it is "anything that is not chaos" (Boulding, 1985: 9). According to Edquist (2004), to the question 'What is a system' is a common answer in the everyday language as well as in scientific contexts (Ingelstam, 2002):

- A system consists of two kinds of constituents: There are, first, some kinds of components and, second, relations among them. The components and relations should form a coherent whole (which has properties different from the properties of the constituents);
- The system has a function, i.e. it is performing or achieving something;
- It must be possible to discriminate between the system and the rest of the world; i.e. it must be possible to identify the boundaries of the system. If one, for example, wants to make empirical studies of specific systems, it must know their extent.

The original purpose of the 'innovation system' was to create a 'focusing device', which puts interactive learning and innovation at the centre of the analysis (quoted in Lundvall, 1992). According to McKelvey (1997), an innovation system is a network involving individual and collective processes of searching, learning and selection among different innovation opportunities, including technical and economic dimensions. Innovation is something that is not static and happens in the form of a process. The results of that process might be static, i.e. a product, but the way to achieve it is definitely not. Every process happens in a system, which might be very simple, as well as extremely complicated (e.g.

CoPS, see elaboration later this sub-chapter). There is no consensus on the exact definition of an innovation system, and the concept is still emerging. Innovation is often the result of the interaction among an ecology of actors, and the term 'innovation ecosystem' is occasionally used to emphasise this. For some, the term 'innovation ecosystem' is a subset of, or synonym for, the 'innovation system'. Others separate the expressions, using the expression 'innovation system' for labelling a planned innovation environment, and 'innovation ecosystem' for an ecological innovation environment (see also: Malerba, 2002c).

An innovation system is a flow of technology and information among people, enterprises and institutions, which is the key to an innovative process. It contains the interaction between the actors who are needed in order to turn an idea into a process, product or service in the market. According to innovation systems theory, innovation and technology development are results of a complex set of relationships among actors in the system, which includes enterprises, universities and research institutes. Innovation systems can be categorised (see for example Edquist, 1997a) into national innovation systems [NIS – determined by national boundaries and focussed on the roles of governmental and non-governmental organisations and institutions (Freeman, 1987; Nelson, 1993; Lundvall, 1992)], regional and local innovation systems [the boundary is the region (Cooke 1992; Cooke *et al*., 1997)], sectoral innovation systems [the boundary is the economic sector or economic unit, e.g. a firm (Breschi and Malerba, 1997)], and technological systems and distributed innovation systems [the focus is mainly on networks of agents for the generation, diffusion and utilisation of technologies and for innovation (Carlsson and Stankiewicz, 1995; Hughes, 1984; Callon, 1992; Andersen *et al*., 2000, 2001)]. However, these bodies of literature have significant overlaps too; they also serve to complement one another in identifying additional features, which may affect the process of technological change (Senker, 1999). The NIS approach is a macro-level concept, whereas the technological systems approach focuses on the meso and micro levels in specific techno-industrial areas. Socio-technical approaches also focus on the meso and micro levels but make a significant contribution in emphasising public or private social actors, and intermediates in the network. The notion of a sectoral system of innovation and production complements all the other concepts within the innovation system literature. Indeed, as argued by Bugge *et al.* (2010), common to all these approaches to innovation systems is that they apply a systemic understanding of industrial development and economic growth, however, although many of these approaches have included the public sector into the

analysis of the innovation processes in the private sector, they have tended to leave out the innovation dynamics within the public sector itself. Applied to the public sector an innovation systems approach would typically see the behavioural changes of a public organisation in relation to the interaction with its users (e.g. citizens or companies), its subcontractors (e.g. suppliers of ICT infrastructure or technical equipment), its collaboration partners (public or private), its political and institutional set-up as well as its management and intra-organisational dynamics, learning and absorptive capacity. Therefore, a successful innovation process in the public sector includes the generation and adoption of new ideas, their implementation, and it depends both on internal capacity and linkages with external actors.

According to the OECD/Eurostat (2005, p. 20-2), the general institutional environment, or system, determines the broad parameters within which firms operate; with some exceptions and/or modifications, it applies also to the public sector and its services. The component elements of this environment include:

- The basic educational system for the general population, which determines minimum educational standards in the workforce and the domestic consumer market;
- The university system;
- The specialised technical training system;
- The science and research base;
- Common pools of codified knowledge, such as publications, technical, environmental, and management standards;
- Innovation policies and other governmental policies that influence innovation by firms;
- Legislative and macroeconomic settings such as patent law, taxation, corporate governance roles and policies relating to interest and exchange rates, tariffs, and competition;
- The communications infrastructure, including roads and telecommunication networks;
- Financial institutions which determine, for example, the ease of access to venture capital;
- Market accessibility, including possibilities for the establishment of close relationships with customers as well as matters such as size and ease of access;
- Industry structure and the competitive environment, including the existence of supplier firms in complementary sectors.

Based on the literature, Edquist (2004) constructed a hypothetical list of ten activities common to innovation systems. The activities listed are not ranked in order of importance, but start with knowledge inputs to the innovation process, continue with the demand-side factors, the provision of constituent of innovation systems, and end with support services for innovating firms.

(1) Provision of R&D, creating new knowledge, primarily in engineering, medicine, and natural sciences;

(2) Competence building (provision of education and training, creation of human capital, production and reproduction of skills, individual learning) in the labour force to be used in innovation and R&D activities;
(3) Formation of new product markets;
(4) Articulation of quality requirements emanating from the demand side with regard to new products;
(5) Creating and changing organisations needed for the development of new fields of innovation, e.g. enhancing entrepreneurship to create new firms and 'intrapreneurship' to diversify existing firms, or creating new research organisations, policy agencies, etc.;
(6) Networking through markets and other mechanisms, including interactive learning between different organisations (potentially) involved in the innovation processes. This implies integrating new knowledge elements developed in different spheres of the innovation system and coming from outside with elements already available in the innovating firms;
(7) Creating and changing institutions – e.g. IPR laws, tax laws, environment and safety regulations, R&D investment routines, etc. – that influence innovating organisations and innovation processes by providing incentives or obstacles to innovation;
(8) Incubation activities, e.g. providing access to facilities, administrative support, etc. for the new innovative efforts;
(9) Financing of innovation processes and other activities that can facilitate commercialisation of knowledge and its adoption;
(10) Provision of consultancy services of relevance for innovation processes, e.g. technology transfer, commercial information, and legal advice.

In order to understand and analyse public sector innovation in the systems framework, one should select a suitable concept. As briefly shown before, there are different systems frameworks available in the literature. The following table 4.3 synthesises different approaches more closely in order to choose or combine a suitable one for the public sector.

Table 4.3 Synthesis of different 'system' frameworks

System type	Main characteristics	Authors
National Innovation Systems (NIS)	The framework rests on four basic concepts: innovation, learning, systems, and nation. Focuses on interaction and mobility. Stresses that flows of knowledge, technology and innovation among people, enterprises and (research) institutions within a country are the key to the innovation process. The main elements of the system are formal institutions (organisations), informal institutions (social and cultural values) and production systems.	Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist, 1994, 1997a, b; OECD, 1997, McKelvey, 1997; Senker, 1999
Regional and local innovation systems	The NIS concept can be limited or extended to the local or regional level, creating a framework accordingly for the local or regional innovation system, i.e. the boundary is the region.	Cooke 1992; Cooke *et al*., 1997
Technological systems (TS) and distributed innovation systems	A network of agents interacting in the economic and industrial area under a particular institutional infrastructure and involved in the generation, diffusion, and utilisation of technology. Differ from NIS by focusing on specific techno-industrial areas, boundaries technological not geographical, scope is limited to microeconomic considerations, focuses on the application not diffusion of knowledge.	Hughes, 1984; Callon, 1992; Carlsson and Stankiewicz, 1993, 1995; Senker, 1999; Wörner and Reiss, 1999; Andersen *et al*., 2000, 2001
Socio-technical networks	An integrated approaches from both economics and sociology to explain the organisation of socio-economic relationships. These types of networks are believed to be the main components of contemporary innovation management, and especially of system of innovation.	Enzing and Kern, 1999; Senker, 1999
Sectoral system of innovation and production	Complements other concepts within the NIS literature related to national, regional/local innovation systems, technological systems, and socio-technical networks. Sectors provide a key level of analysis for economists, business scholars, technologists, economic historians and policy makers in the examination of innovative and production activities. From sectoral system perspective, national, regional and/or local boundaries matter to varying degrees depending upon the specific sector under consideration. Similarly, the sectoral system of innovation approach encompasses and includes the technological systems approach, by placing it within the sectoral context and its economic activities processes.	Breschi and Malerba, 1997; Malerba, 2002a, b, c
Systems of competitiveness and clusters	National diamond framework, together with his work on competitive five forces theory, value chain framework and theory of competitive advantage can be used both to analyze a firm's ability to function in a national market, as well as analyse a national markets ability to compete in an international market. Porter's clusters framework explains how clusters foster high levels of productivity and innovation and lays out the implications for competitive strategy and economic policy.	Porter, 1985, 1990, 1998
High cost complex product systems 'CoPS'	CoPS includes high value products, capital goods, control systems, networks and civil engineering constructs. CoPS tend to be made in one-off projects (or small batches) and the emphasis of production is on design, project management, systems engineering and systems integration. Examples include telecommunication exchanges, flight simulators, aircraft engines, avionics systems, train engines, air traffic control units, systems for electricity grids, offshore oil equipment, intelligent buildings and cellular phone network equipment.	Hobday, 1998, 2000

Source: Composed by the author

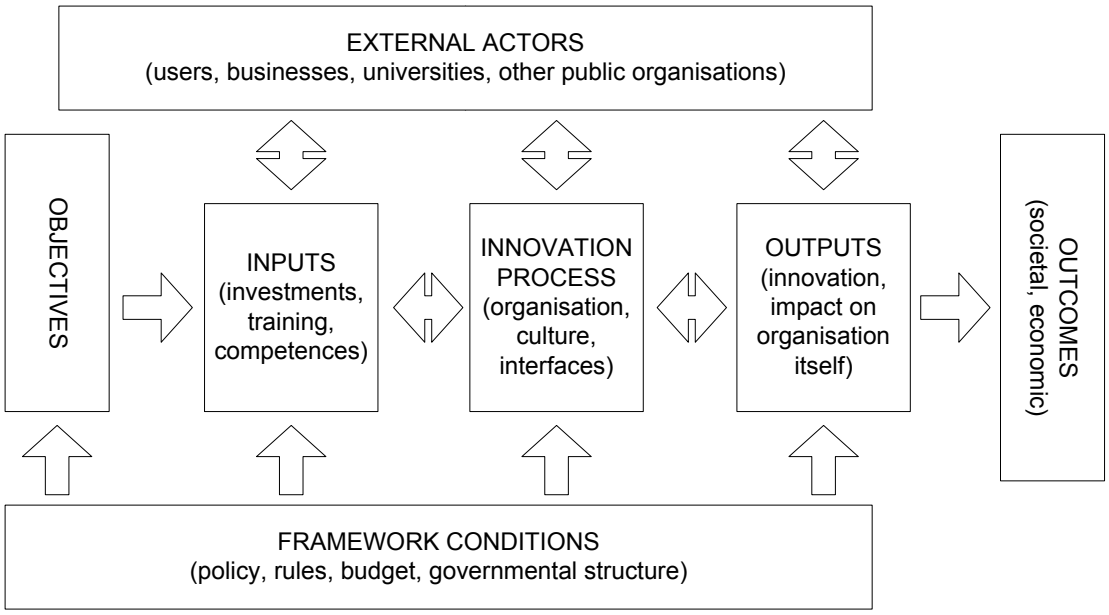
The systems frameworks elaborated above also certainly have their limitation. Firstly, they tend to fit into a particular contexts and one should choose or develop an appropriate 'model' to work with depending on the area and other circumstances. Secondly, the conceptual framework of NIS, for example, concentrates on the supply side and ignores demand by final consumers and the role of the media in influencing such demand; NIS might also differ by industrial sectors (Senker, 1999).

From previous elaborations we see also that the majority of the systemic concepts of innovation and/or business process have been developed for the private sector. However, the current research is tackling innovation in the public sector, more precisely in technologically innovative public sector services. As the theoretical concepts elaborated show, organisations do not exist in vacuum. To be able to understand and explain innovations, all-important elements shaping and influencing the dynamic of the system must be taken into account also in the public sector (Røste, 2005). These are not restricted to economic elements, but also organisational, institutional, social and political factors, mechanisms and relations. The legal conditions and the norms and cultures in the institutional context represent important incentives and constrains to innovation. Through their activities, companies (or organisations) establish relations with other institutions, suppliers, competitors, with customers and with other financial, technological and market partners. These relationships and their institutional context make a complex map of company's (or organisation's) interaction with sources of knowledge and technology and the potential for learning and cooperation. This cumulative accumulation of knowledge and skills, i.e. the learning process, is crucial for innovation (Røste, 2005). Similar findings are supported by Koch and Haukens (2005), who claim that in order to learn and innovate, the actors in the public sector must interact with other actors, this being people, organisations or various sources of information. The ability to innovate is dependent on their ability to find such relevant competences, understand them and make use of them. Koch and Haukens call these mutual learning environments innovation networks, which may be informal, i.e. dependent on individuals working in the public organisation, or a more formal, permanent working group of experts, a conference or seminar tackling the issue. Koch and Haukens use the term 'system' while talking about innovation barriers in the healthcare sector, stating that problems concern the systemic nature of innovation, i.e. the possibility that the introduction of one innovation may shift the underlying problem to another, downstream, part of the system or may have unforeseen and adverse consequences. Thus, according to their words, the

introduction of any innovation should require close *ex ante* assessment, coupled with careful review and evaluation.

Bloch, (2010) argues that while the generic elements may be in the public sector similar to that for businesses, there may be very important differences in the details of these elements – in the characteristics of services provided, in the decision-making and organisational structure, general framework conditions, objectives, and the overall process by which ideas are created, transformed and implemented as innovations. He suggests that while the overall model may be very similar, when specified in detail the measurement framework will need to be different to capture the specificities of public sector innovation. He proposed a model of innovation in public sector organisations (see figure 4.13), which is divided into seven 'elements' starting with objectives, then inputs, the innovation process itself, outputs and outcomes. This 'linear' approach of innovation is surrounded and influenced by external actors and framework conditions.

Figure 4.13 A model of innovation in public sector organisations



Source: Bloch (2010)

Inputs of this model are relatively typical, however not always common in the public sector, e.g. effective technological infrastructure, development investments, training, consultancy, competences, educational background, experiences and diversity of staff, etc. How organisations then innovate, is the

matter of innovation process – it is related to culture (e.g. attitude towards risk), incentive structure and perception of barriers to innovation. Additional elements of the innovation process are the placement of innovation in the overall strategy (or business model), the role of management in promoting innovation, and the structuring of innovation processes. Importantly, incentive structures in the public sector are both a factor influencing innovation processes within the organisation and as part of framework conditions, determining incentives for the organisation as a whole. Incentivising might be made up of the direct rewards (or penalties) to individuals and/or the organisation for innovation, but also a broader set of internal and external factors that promote (or hinder) innovation activities (e.g. regulations and policies, political environment, general leadership of the city, region or whole country).

Contacts, linkages and knowledge flows are also important aspects, both within and outside the organisation – external information seeking, cooperation with others, both side sharing of innovative ideas, are all characteristics that shape the innovation process. These flows can have different partners (e.g. technology providers and other businesses, users and citizens, other public organisations locally and internationally).

Finally, outputs – goods and services delivered or other activities by public sector organisations, and outcomes – broader end-outcomes of public service activities, where these outcomes will generally also be affected by a variety of other factors (van Dooren *et al.*, 2006). A main output is innovations themselves – actual implementation of changes to services or other parts of the organisation's operations. Some organisations may be more prone to incremental improvements in their organisational processes while others seek to develop new types of services.

Bloch's (2010) model finally indicates that successful innovation is associated with some form of performance improvement, either in terms of higher quality in the organisation's activities, increased efficiency, or both. In addition, innovation efforts can be associated with greater satisfaction among both employees and users. Social outcomes (social cohesion, equality, reduced crime, poverty reduction, better educated population, improved health, etc.) are also important, as they represent the central aims of public services. Moreover, successful innovation can carry other, intangible benefits, such as improving the image of the organisation and the services it delivers, thus strengthening its legitimacy and trust from users or other stakeholders.

According to Bugge *et al.* (2010), part of the multifaceted and heterogeneous nature of the public sector is the outcome of its many interfaces: (1) its interface to the private sector, (2) the interface between the public sector and the citizens, and (3) internal interfaces in the public sector, e.g. across various governmental levels and across activity areas. Together, the various interfaces indicate some of the heterogeneity of the public sector which, according to Bugge, may be helpful when trying to decipher the logics of innovation in the public sector and how the public sector innovation system looks like. In particular, the form the interfaces take and which are most important may have a large impact on innovation processes in public sector organisations. These different characteristics refer mainly to organisational innovation that can occur through formal partnerships/programmes but also wider inter-organisational arrangements. In such complex systems, the coordination of various organisations' activities is a central feature for innovating (Borins, 2001d, 2006). This includes conducting a systemic analysis of how the problem in question interacts with other issues and programmes, fostering inter-organisational collaboration (education and health, implementation of systematic data cross-check procedures, etc.), and implementing integrated, multi-faceted services (single desks/portal delivering a wide range of services).

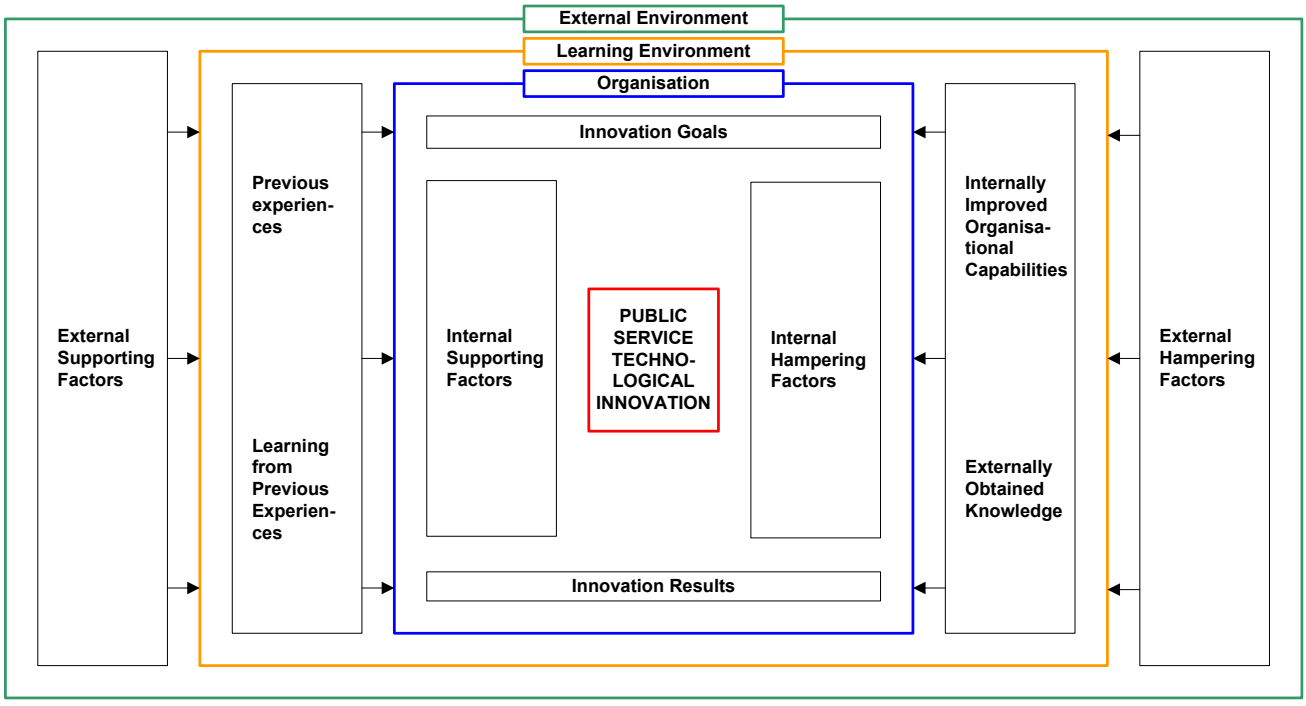
Looking at these different concepts of innovation systems, one should generally agree that while developing a concept for public sector innovation research, it should provide a framework for analysing and developing public sector and governance practices at the national level, at the level of a set of, or a single public institution, its unit or particular public service. Therefore, depending on the approach under consideration, one should choose an appropriate framework, identify relevant actors and relationships, and specify the innovation process. This leads to the understanding that to be meaningful in analysis, an appropriate systems framework should be tailor-made. Different fundamentals and components of the system can be surely taken from the literature and systems frameworks elaborated earlier; however, one should be avoiding one-fits-all innovation system frameworks for all different occasions.

At the organisational or its unit level, the model proposed by Bloch in 2010 (five years after the survey of the present research was conducted) is logical. Indeed, depending on the purpose of the research and the research question, it can be outlined differently. The research question of this thesis asks what is relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of public service innovation system (in four European countries). In

order to conduct the analysis, a four layer conceptual framework is used: managerial perspective, learning perspective, technological perspective and systems perspective. These dimensions are associated with the four following, specific sub-research questions: (I) Managerial perspective – what are the key-features influencing, supporting and hampering, the development and implementation of successful, technologically innovative public sector services? (II) Learning perspective – which managerial and organisational improvements are necessary to innovate in public sector services? (III) Technological perspective – what is the importance of technological knowledge in the public service innovation process, where and how it is developed? (IV) Systems perspective – what does the composition and dynamics of public sector (service) innovation system look like across countries?

Based on these preconditions, the research framework combined with the proposed public sector innovation system of this thesis is presented in figure 4.14. The framework has three sub-structures – external environment, learning environment, and the organisation itself with its innovation goals and results.

Figure 4.14 The research framework combined with the proposed public sector innovation system framework model



The external environment can either support or hamper the innovation process. From the supportive perspective, this includes political demand, political commitment to long term major projects, supportive policies, appropriate laws and regulations, competition, budgetary pressure, existence of good examples, technology push, low technological risk, good cooperation with partners, user demand and user trust. From the hampering perspective, high political, reputation and technological risks and digital divide can be added.

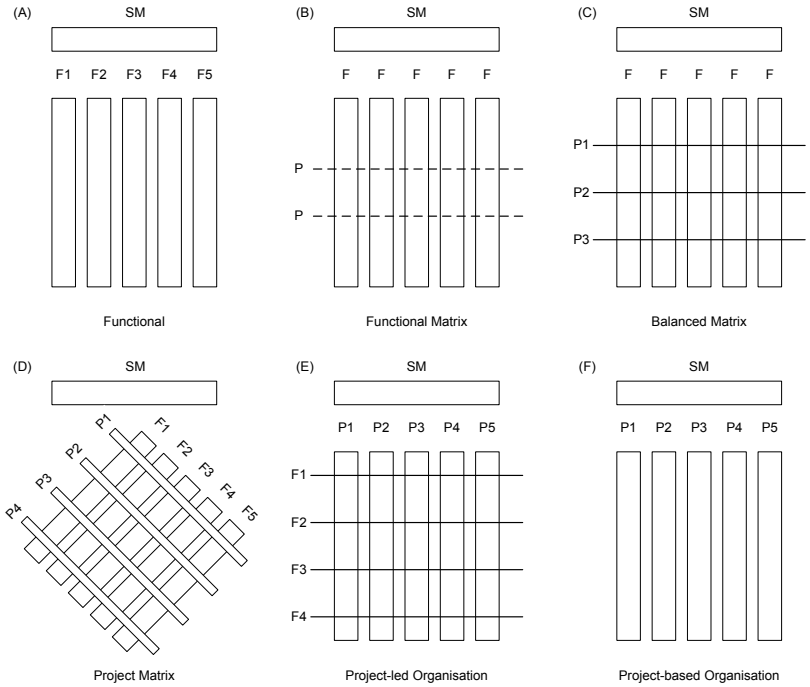
The learning environment (which will be more deeply elaborated later in this chapter) is linked to organisational capabilities required for innovation – which organisational capabilities did the organisations internally improve in order to innovate, which capabilities did the organisations obtain externally in order to innovate, did the organisations have any previous experiences with similar innovations, and did the organisations learn from the previous experiences while innovating (internally and externally, from positive and negative ones)? Also, which types of intra-organisational capabilities were improved in order to innovate, e.g. general management skills, project management skills, technological knowledge, organisational structure, motivation system of personnel, etc.?

At the organisational level, factors influencing the innovation process can be supportive organisational strategy, top management commitment and support, open-minded managers, hierarchical (top-down) power, personal leadership or committed 'key' individuals, available mandate, motivation and tools of the project manager, innovation accepting organisational culture, flexible organisational structure, good knowledge of existing technologies, close cooperation with technology providers, good market knowledge (existence of client surveys, etc.), close cooperation with future users and user groups, and internal learning capabilities. From the internal hampering side, lack of ideas, stagnating organisational and/or rigid organisational structure, previous negative experiences and failures, and lack of market knowledge can be also added.

Finally, we can look at the innovation process also from the project structure perspective – both within the organisation and with external partnerships. As suggested by Hobday (2000; see figure 4.15), this may be functional, pure project, matrix, or the combination of the above (for additional project related processes see also PMI, 2002). Indeed, in many public sector organisations there are few or no formal processes for conducting the innovation process (Eggers and Singh, 2009), which leads to 'random incrementalism' in the public sector (Bason, 2010). Managers focus on budgeting, operations and tasks,

and employees may be highly skilled lawyers, economists, doctors, nurses and schoolteachers – but few of them have formal skills in creativity and innovation (Osborn and Brown, 2005). According to Bason (2010), public sector organisations (at best) operate with highly linear, 'stage-gate' project process (if they even have a formal project organisation). However, innovation, in particular its early 'front end' phases, need to focus more on co-creation: open collaborative processes, interaction, active user involvement, visualisation, prototyping, tests and experimentation (Kelley, 2001; Sanders and Stappers, 2008; Brown, 2009). Most public sector organisations have not put in place the formal systems, or built the capacity among leaders and employees, that enable such processes to take place (Bason, 2010). In particular, they have not put in place types of practices that may generate more radical or discontinuous' innovations (Bessant, 2005). And once a random innovation in the public sector happens, it is most surely not scaled, which is the most significant challenge to realise the potential of innovation in government (Bason, 2010). In the absence of a market mechanism, which in the private sector generates significant demand for solutions that can lead to a profit, how might we create an army of 'willing adopters'? (Mulgan, 2009). What are the tools, approaches and means that can scale public sector innovations from one domain to all the domains they might benefit? Traditional methods such as best practice publications, websites, toolkits, command and control efforts, networks of various forms of collaborations have proven to be of limited effectiveness (Mulgan, 2007; Harris and Albury, 2009).

Figure 4.15 Types of organisational structure: (A) functional; (B) functional matrix; (C) balanced matrix; (D) project matrix; (E) project-led organisation; (F) project-based organisation



Key:

* F1-F5 = various functional departments of the organisation (e.g. Marketing, Finance, Human Resources, Engineering, Manufacturing, R&D)
* P1-P5 = major project within the organisation (e.g. CoPS projects)
* SM = senior management

Note:
* The number of functions and projects will vary according to the organisation in question. Various permutations are used here for illustration.

Source: Adapted from Hobday (2000)

Discussions in this sub-chapter gave us a strong argument to believe that systematic approaches can give new insights into innovative performance of public sector and public service organisations (PSOs). Therefore, the current research transfers the core of the systems research philosophy to the public sector. We will analyse technologically innovative public sector services in a systems perspective, as well as the conclusions given in this frame. We believe that, similarly to the private sector, innovation and technological development in public service organisations is a result of a complex set of relationships among intra- and extra-organisational actors and competences in the system. In addition, we do not deal with public service organisations in one piece in a surrounding system. Instead, we consider the public service innovation system as a horizontal set of intra and extra-organisational factors influencing, supporting and hampering the innovation process in public sector services. Moreover, the external factors are not viewed on an institutional basis (common to systems of

innovation literature); instead, they are considered functional, not linked to a particular institution. This view is supported by Radošević (1998), who stresses that systems of innovation should be defined not only in institutional terms, but also in technological terms or, more generally, in functional terms. Only institutional variety that performs different economic functions (functional variety) can be considered relevant from an economic perspective (Radošević, 2005, p. 10); similarly, in terms of technology, only variety that performs different technological functions (technological variety or variety in terms of technological regime) can be considered relevant from an economic-institutional perspective. Radošević also argues that the absence of broader contextual factors and the dominance of person centric lines of research have limited the understanding of how contextual factors and system level variables affect entrepreneurship (Radošević, 2006), the term which was elaborated in the previous chapter.

4.5. Summary and considerations

The literature review chapter (chapter 2) brought together the key contributions of the literature of innovation, modernisation and transformation in the public sector. Chapter 3 analysed the existing empirical studies around this increasingly important topic. The purpose of these chapters was to give us a more comprehensive and structured view on how innovation in the public sector is theoretically understood and how much is known about the public sector innovation process in practice. The present chapter 4 developed a conceptual framework for further survey and empirical analyses of this thesis with an ultimate goal to understand the key features influencing the development and implementation of technologically innovative public sector services and the system in which it occurs. The framework developed had four different theoretical perspectives (see figure 3.1). These perspectives were the organisational view (in a majority of ways, innovation is still an organisational issue), the learning view (the role of knowledge in innovation process is strongly emphasised by many theoretical literatures, especially the evolutionary literature), the technological view (as it is widely acknowledged that technological change and innovation are major drivers of productivity growth, economic growth and lie at the very heart of the competitive process), and the systemic view (the general argument is that innovation takes place in a system, consisting individuals, firms and institutions, and within a certain cultural and regulatory framework).

These contributions should facilitate the empirical exploratory survey of the present research with an ultimate research question (RG) “What is the relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of public service innovation system in four European countries?” The survey methodology, sub-research questions and related area-specific propositions drawn from the existing literature are presented in the next methodology chapter (chapter 5).

5. METHODOLOGY

> *"This is largely the methodology I've used throughout my career - that is, starting with a question as to what might be the properties of a set of compounds that could be invented which were unusual and unpredictable. Many times I've felt a bit like Columbus setting sail."* Donald Cram.

This research has been planned as an exploratory attempt to assess empirically the relative importance of different factors influencing the innovation process in public sector services and how they determine the nature of the public service innovation system in four European countries: the UK, Denmark, Finland and Estonia. The research question of the thesis asks what is the relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of the public service innovation system? Due to the theoretical and methodological limitations elaborated in chapters 2 and 3, the choice and structure of theoretical foundations, the methodology, the case definition as well as the sample developed for the study are experimental as a result of this particular multidisciplinary exercise. The research framework (see chapter 4) has four perspectives through which the public sector innovation process is analysed: managerial, learning, technological, and systems perspective.

5.1. Country selection, unit of analysis and definitions

These particular countries (the UK, Denmark, Finland and Estonia) were selected for the survey because of the following reasons. Firstly, as for a comparative study, one needs to select countries with a different nature and background – the selected countries differ in size, level of economic development and historical roots. Secondly, they all are relatively advanced in applying new technologies, services and/or management methods in the public sector; however, their public sector development waves have been different. Thirdly, in all four countries English is widely spoken, minimising translation or understanding errors. Finally, the country selection was discussed and validated by field experts, as well as the SPRU research community. Additionally, the author has personal experiences and a cultural understanding of all four countries, helping to put the research findings professionally into a wider context.

According to the Oslo Manual (OECD/Eurostat, 2005), innovation data should ideally be compiled and collected at the organisational level for which decisions on innovation activity are made. The statistical unit of the population may also be defined using the KAU-concept (Kind-of-Activity-Unit) [25], which is followed in this research (see also the elaborations of Bloch, 2011). In the current research, the basic unit of analysis for understanding the innovation process in public sector services is a specific technologically innovative public service ('the case'), developed and implemented by an actual organisation, and which directly or indirectly benefits citizens or customers. There are also many other types of public sector innovations, however, they have been left aside from the present research. The other types of innovation might be, for example according to Halvorsen *et al.* (2005), technology procurement as such, internal technological development, bureaucratic and organisational reform, new policies, etc.

In defining the research subject and objects, we have followed the basic definitions of innovation suggested by Oslo Manual (OECD/Eurostat, 2005). However, we have developed the definitions, describing the research subject, from the perspective of the current research. The final definitions used for the present research are the following:

- Public services are considered technologically innovative if they have a significant technological component or application that significantly improves the service or integrates systems (the author);
- Services are considered successful if the technological component has: (a) radically changed the behaviour of the introducing institution (or its unit); (b) significantly improved the take-up of the service; (c) significantly improved the quality of the service; (d) significantly reduced time spent on service delivery; (e) personalised the service; (f) reduced significantly the cost of the service; or (g) made the service more accessible, including being available online (the author);
- Public services are defined to be those services managed in the public domain (not necessarily provided there), funded predominantly by government-raised income, and subject to direct or indirect control of elected politicians (Willcocks and Harrow, 1992);
- The innovation can appear in the form of a new or improved product (service) or process (OECD/Eurostat, 2006; the author);
- A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended use. This includes significant

[25] KAU (see the Oslo Manual §237) is defined as "an enterprise or part of an enterprise which engages in one kind of economic activity without being restricted to the geographical area in which that activity is carried out".

improvements in technical specifications, components or materials, incorporated software, user friendliness or other fundamental characteristics (OECD/Eurostat, 2006);

- A process innovation is the implementation of a new or significantly improved production or delivery method (including system integration). This includes significant changes in techniques, equipment and/or software (OECD/Eurostat, 2005; the author);
- The innovation can be incremental (evolutionary) or radical (OECD/Eurostat, 2005);
- The innovation can be new to the organisation or new to the market (OECD/Eurostat, 2005);
- Pure marketing innovations or organisational innovations (as defined by OECD/Eurostat, 2005) without a major technological component [product (service) or process] are not considered 'innovations' in this research (the author).

5.2. Research framework, research questions and propositions

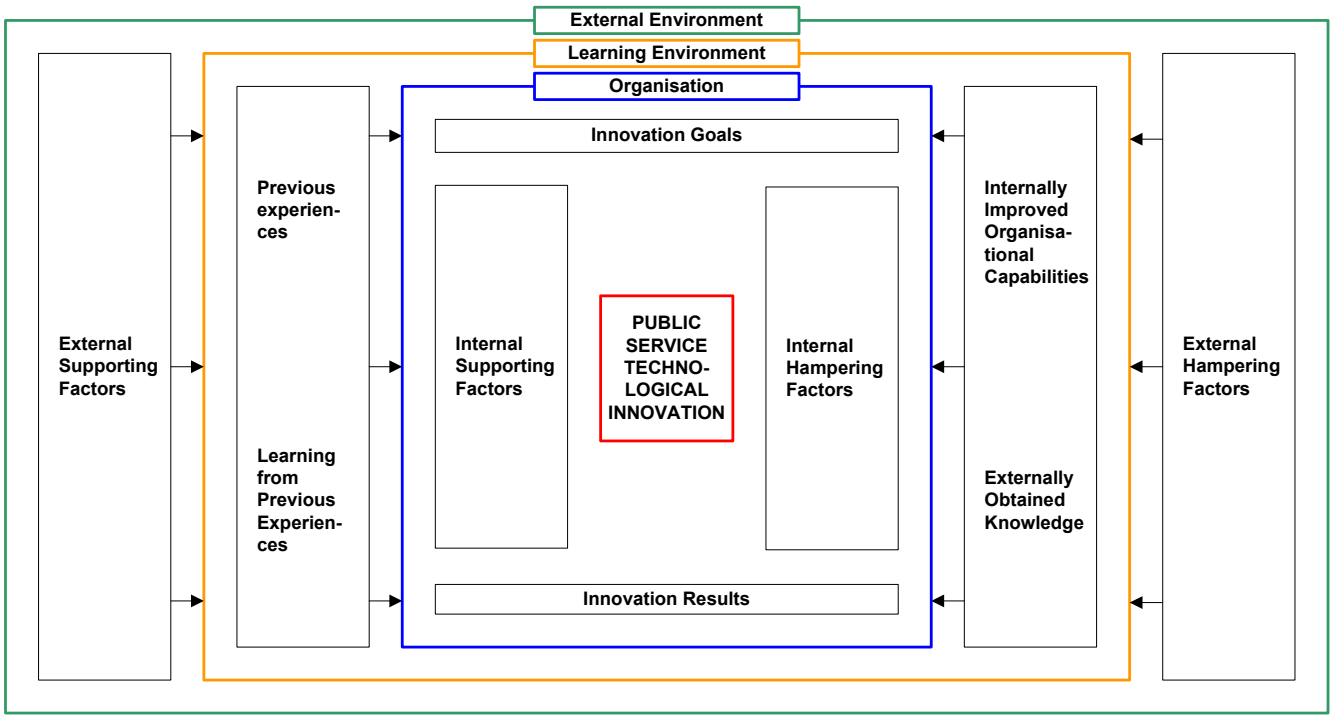
The research question (RQ) of the thesis is the following: "What is relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of the public service innovation system in four European countries?"

The conceptual research framework with four perspectives developed in chapter 3 was used to propose the following sub-research questions, which should help answer the main research question:

- Managerial perspective – What are the key features influencing, supporting and hampering, the development and implementation of successful, technologically innovative public sector services (SRQ1)?
- Learning perspective – Which managerial and organisational improvements are necessary to innovate in public sector services (SRQ2)?
- Technological perspective – What is the importance of technological knowledge in the public service innovation process, where and how is it developed (SRQ3)?
- Systems perspective – What does the composition and dynamics of public sector (service) innovation system look like across countries (SRQ4)?

The research framework combined with the structure of the proposed public sector innovation system is presented in figure 5.1. The framework has three sub-structures – external environment, learning environment, and the organisation itself with its innovation goals and results (for detailed elaboration see chapter 4).

Figure 5.1 The research framework combined with the proposed public sector innovation system framework model



We have also developed partly sub-research question related and area-specific propositions drawn from the existing literature, to be tested throughout the empirical part of the thesis (see table 5.1).

Table 5.1 Research propositions and related arguments from the literature

Area	Propositions	Arguments from the literature
MANAGEMENT	PM1: Factors (including goals) influencing the innovation process in public sector services differ to some extent from those known from the private sector.	Based upon extensive quantitative analysis in North America and across the Commonwealth countries, Borins (2001c, see also chapter 3) concluded that a common denominator of all the characteristics of public sector innovation is that they look very much like the private sector. However, in their Publin case study research, Vigoda-Gadot *et al.* (2005) received mixed results on this issue, where the majority of interviewees reported differences between innovation in the public and in the private sectors. During the interviews, Publin project team also found that the public sector is less willing to take risk than the private sector (see Koch and Hauknes, 2005 and sub-chapter 2.2). Røste and Miles (2005) similarly argue that differences between private and public sector innovation are less distinct and more nuanced than simplistic views would imply. This is very relevant for measurement of the two sectors and the question whether completely different tools are required (Bugge *et al.*, 2010); see sub-chapter 2.2. We will test the proposition whether factors influencing the innovation process in public sector services differ to some extent from those known from the private sector in our empirical survey.
	PM2: Innovation goals in the public sector are equally polarised.	Despite the innovation goals in the private sector (services) being skewed towards the quality issues (see Howells and Tether, 2004; sub-chapter 4.2), due to multiple values and goals in the public sector (Willcocks and Harrow, 1992; sub-chapter 2.2), there is a reason to believe that possible goals in the public sector services are much more polar. Grout *et al.* (2003; sub-chapter 2.2) also stresses that the typical concern is that publicly controlled organisations, not subject to the discipline of the competitive market, may therefore lack incentives to control costs or provide quality of service and respond to the needs of consumers.
	PM3: Innovation goals in the public sector are technically achieved (i.e. technologically innovative service exists), but the ways in which they are successful fall below the initial expectations (rated as average or poor).	This proposition is set up in order to discover how good are the innovation results in public sector services as compared to the initial expectations. The proposition is motivated by the fact that most governments experience problems when implementing large technology, mostly information technology projects. Budgets are exceeded, deadlines are overrun and often the quality of new systems is far below the standards agreed when the project was undertaken (see sub-chapter 4.3; Standish Group International, 1995, 1996; Borins, 2001b). In addition, the larger the development, the more likely it is that it will be unsuccessful (Goldfinch, 2007) and explanations for failure include (see Heeks, 1999) data inadequacies, technical problems, management/process/technical skill shortages, cultural clashes, political infighting and external environmental factors.
	PM4: Innovation supporters in the public sector can be equally internal to the organisation and external.	Borins (2001b) supports the idea that innovation supporters are always multi-factorial. Indeed, while he asked the respondents what was innovation in their programme, the most frequent characteristic, observed in approximately 60 per cent of programmes, was 'holism', namely that the innovation depended on inter-organisation cooperation, that it delivered multiple services to individuals, or that it took a systems approach to a problem (see sub-chapter 2.3). Vigoda-Gadot *et al.* (2005) found that all of the participants could be initiators of innovation in the public sector. However, managers and frontline employees are the primary initiators of innovation, followed by employees, other organisational personnel and professionals, government and politicians, end-users and external organisations. While the majority of innovations in the public sector are top-down and policy-driven, findings show that interviewees generally see the organisation's management or political parties rather than external organisations or the EU as the initiators of new approaches. Indeed, facilitators of innovation are predominantly internal, organisational forces that include the leadership and management, cultures open to change, supportive personnel and proper funding. External facilitators include the EU, the legislature, or national initiatives, as well as information, learning, and networking.
	PM5: Innovation barriers in the public sector are predominantly internal to the organisation.	Vigoda-Gadot *et al.* (2005) claim that barriers to innovation in the public sector are predominantly internal to the organisation. Their findings show that interviewees perceive barriers to innovation as deriving from public service's leadership and management (i.e. budget cuts or poor allocation of budget funds, and poor leadership). Additional obstacles are the traditional regulations and work routines, employee resistance, internal and external politics, poor learning environment, and end users' resistance (see also chapter 3). Controversially, in private sector services, on a broad level, surveys tend to show that the external conditioning factors are seen as more significant barriers to firm innovation than internal barriers (see Howells and Tether, 2004).

	PM6: Personal leadership (i.e. existence of 'key' individuals) is an internally dominating factor supporting innovation in public sector services.	Drucker (1985) states that entrepreneurs innovate. The importance of such 'key' individuals in the innovation process is stressed by many authors (see Koch and Hauknes, 2005; Rothwell, 1992). Indeed, Borins (2001b) supports the idea that innovation supporters are always multi-factorial and Altshuler (1997) stresses that people in government fear nothing more than newsworthy failure. Therefore, Teofilovic (2002) stresses that strong leadership is a necessary imperative for establishing a cohesive, yet flexible, workplace culture that encourages idea experimentation and tolerates 'smart failures'. Therefore, as it is put by Kubr (1988), managerial attitudes and behaviour in public sector organisations constitute a key issue which consultants have to deal with in most assignments; see also sub-chapters 2.1. It is known that analyses of public policy innovation span a wide-ranging set of policy issues, and identify multiple antecedents and consequences of those innovation policies (see for example Polsby, 1984; Kingdon, 1984; Schon, 1971). However, central to this research is the acknowledgement of a group of individuals who, as Schon (1971) describes them in the private sector, challenge the system, were irrationally committed to the inventions they championed, operated informally and subversively, exploited informal networks and mobilised outside pressures, engaged in life-long combat, and become heroes or martyrs to their cause. Such individuals have been variously referred to as 'champion,' guerrilla,' 'entrepreneur,' 'revolutionary,' and 'missionary' (Schon, 1971), as 'inventor,' 'adapter,' 'policy entrepreneur,' 'broker,' and 'incubator' (Polsby, 1984), or as 'advocate,' 'broker,' and 'policy entrepreneur' (Kingdon, 1984). These individuals lead their ideas through a set of logically and institutionally required hurdles (Roberts and King, 1989). In their Troika-model of innovation promotors, Hauschildt and Kirchmann (2001) differentiate three different layers of these so-called public entrepreneurs: power promotor (at the top), process promotor (in the middle) and technical promotor at the expert or innovator level (at the bottom) (see also sub-chapters 2.3 and 4.1). Indeed, as discovered in the National Audit Office (2009) study, firstly senior management, then the policy team and only then equally the internal innovation team and frontline staff were responsible for innovations (see also sub-chapter 2.3). Therefore, we need to test the proposition of the importance middle level product champions in the public sector innovation process in our exploratory survey.
LEARNING	PL1: Technological innovation in the public sector services requires a broad range of managerial and organisational improvements.	According to Røste (2005), the cumulative accumulation of knowledge and skills, i.e. the whole learning process, is crucial for innovation in the public sector. A similar finding is supported by Koch and Haukens (2005), who claim that in order to learn and innovate the actors in the public sector must interact with other actors, this being people, organisations or various sources of information; see sub-chapter 4.4. In the context of policy learning, Kemp and Weehuizen (2004) suggests in making a distinction between three types of learning: technical learning (about instruments), conceptual learning (about goals, strategies) and social learning (about societal values, responsibilities, appropriate ways of interacting, policy approaches), see sub-chapter 2.3. Indeed, what is not known from the present literature is the relative importance these and other factors, both in terms of innovation barriers as well possible knowledge areas improved while innovating.
	PL2: External learning and consultation plays a positive role in successful public service innovations.	Not all the new ideas are generated inside the focal organisation; some are generated externally but are adopted by the organisation (Damanpour and Gopalakrishnan, 1998). The better the actors at developing networks that can help them get access to the relevant competences and partners that can help them in their learning processes, the greater the chances that their innovation processes will succeed (Kemp and Weehuizen, 2004; see sub-chapter 2.3). From the organisation's perspective, this altogether reflects in the absorptive capacity – the firm's fundamental learning processes: its ability to identify, assimilate, and exploit knowledge from the environment (Cohen and Levinthal, 1989 and see sub-chapter 4.2). Developing and maintaining absorptive capacity is critical to a firm's long-term survival and success because absorptive capacity can reinforce, complement, or refocus the firm's knowledge base (Lane *et al*., 2006). Controversially, taking into account the importance of different innovation champions that the literature stresses (see the previous proposition), one might conclude that real innovation is an exploratory and self-driven process without too much external learning and consultancy used. Moreover, as concluded for the private sector by Winter (1984), not all external knowledge may be easily used and transformed into new artefacts. If external knowledge is easily accessible, transformable into new artefacts and exposed to many actors (such as customers and suppliers), then innovative entry may take place.

	PL3: Innovation-related learning in public sector services is cumulative and can result equally from previous positive and negative experiences, internally and externally.	Innovation management literature (e.g. Rothwell *et al.,* 1974; Rothwell, 1974, 1992; Tidd *et al.,* 2001; sub-chapter 4.1) suggests that success is multi-factorial and studies show that, in general, successful innovators outperform failures across the board. Moreover, success is a matter of competence in all functions, and of balance and coordination between them, and not of doing one or two things brilliantly well (Cooper and Kleinschmidt, 1988). According to Bloch (2010) the willingness to take on risk and the ability to learn from failures are important issues for public sector innovation. This motivates gaining more information on failures, both implemented changes (innovations) that did not meet their objectives or had negative impacts, and innovation projects that were abandoned. Therefore, we support the view that innovation and risk-taking are influenced by previous experiences, both within the organisation and outside. Literature also suggests that innovation can be represented as a learning cycle (or learning mode), involving a process of experiment, experience, reflection and consolidation. Managing the process is primarily a function of the creation of conditions under which learning opportunities emerge and are exploited. A key determinant of relative success or failure is the ability to manage this learning cycle in explicit form (Hale, 1996; Bowen, 1994; Hayes *et al.*, 1988; Maidique *et al.*, 1985). According to Bloch (2010), there are two directions in this respect at play: dissemination (outbound) and learning (inbound). Indeed, even if there has been a growing culture of evaluation and policy learning over the last two decades in most advanced economies, many public sector organisations are still essentially navigation blind when it comes to real-time, relevant management information on performance (Bason, 2010) and applying past experiences and best practices available. Also, available empirical exercises have not tried to quantify and compare the relative importance of learning from previous experiences (within the organisation, externally, from positive and negative ones), see also sub-chapter 4.2.
TECHNOLOGY	PT1: Technological knowledge is the major element improved internally and obtained externally in the development process of public service innovations.	Explanations of failure of public sector technology projects include (see Heeks, 1999, and sub-chapter 4.3) data inadequacies, technical problems, management/process/technical skill shortages, cultural clashes, political infighting and external environmental factors. According to Heeks (2006), e-government systems are information systems that are socio-technical: combining the technical and the human. Heeks stresses that most of the e-government initiatives fail due to their poor implementation and management. According to his earlier work (Heeks, 2001), there are seven dimensions necessary and sufficient to provide the understanding of e-government design-reality gaps: (1) information; (2) technology; (3) processes; (4) objectives and values; (5) staffing and skills; (6) management structures and skills; (7) other resources: time and money. The evolutionary literature (see sub-chapter 4.2) has proposed for the private sector that sectors and technologies differ greatly in terms of knowledge base and learning processes related to innovation. Knowledge differs across sectors in terms of domains (Malerba, 2000b). First, the knowledge domain spans applications, users and demands of sectoral products. Second, the domain reflects the specific scientific and technological fields at the base of innovative activities in a sector (Dosi, 1988; Nelson and Rosenberg, 1993), as well as the sources of technological opportunities, which differ across sectors. Freeman (1982) and Rosenberg (1982), among others, have shown that in some sectors opportunity conditions are related to major scientific breakthroughs in universities. In other sectors, opportunities to innovate may often come from advances in R&D, equipment and instrumentation. In still other sectors, external sources of knowledge in terms of suppliers or users may play a crucial role. Despite these mixed views, there is a reason to believe that technological knowledge might still be the major element improved internally and obtained externally in the development process of public sector innovations.
	PT2: The role of technology in today's public sector is integrated with other managerial processes; the time when technology was considered something separate and different is over.	In the private sector, if advanced integration capabilities are necessary (Cohen and Levinthal, 1989), the industry may be concentrated and formed of large established firms. This domain relates to the degree of accessibility of knowledge (Malerba and Orsenigo, 2000), i.e. opportunities of gaining knowledge that are external to firms. Knowledge that is accessible may be internal or external to the sector. In both cases, greater accessibility of knowledge decreases industrial concentration. Besides acquiring external knowledge, many firms have also actively begun to commercialise technology, for example, by means of out-licensing. This increase in inward and outward technology transactions reflects the new paradigm of open innovation (see Lichtenthaler and Ernst, 2009; chapter 2.3). Interestingly, Senge (1990a) identifies five new 'component technologies' that he claimed were gradually converting to learning organisations – systems thinking, personal mastery, mental models, building shared vision, and team learning – none of them directly related to technology. Indeed, technological factors can be a strong determinant for subsequent innovation (Koch and Haukens, 2005; chapter 3). Moreover, in their 'New Growth Model', Kekkonen (2000) gives the central position to knowledge, information and innovations, which get inputs from education, research and technology, and give outputs via increased productivity to economic growth, growth of exports, higher employment, regional development and an increase in welfare (see sub-chapter 4.2). Indirectly, the literature tends to suggest that technological progress is seen more as an integrated process in organisational upgrading than something clearly separate due to the sophistication and complexity of modern technologies.

	PT3: Classical 'technology push' does not work in the public service innovation process.	The classical linear model of innovation (a theoretical construction of industrialists, consultants and business schools, seconded by economists, see Godin, 2005 and sub-chapter 4.1) postulated that innovation starts with basic research, followed by applied research and development, and ends with production and diffusion. Very few people defend such an understanding of innovation anymore: "Everyone knows that the linear model of innovation is dead", claimed Rosenberg (1994), but it is not always the case. Godin (2005) argues that the long survival of the model, despite regular criticisms, is due to statistics. Having become entrenched with the help of statistical categories for counting resources and allocating money to science and technology, and standardised under the auspices of the OECD and its methodological manuals, the linear model functioned as a 'social fact'. Rival models, because of their lack of statistical foundations, could not easily become substitutes. Conversely, while analysing the relative importance of information and communication technologies (ICT) in boosting national wealth in Estonia, Tiits and Rebane (2009; see also sub-chapter 4.3) found that ICT take-up in a particular sector (including government) is dependent on many interrelated aspects, such as resistance to change, availability of appropriate technological competences in that particular sector in a country, but also on local and global technology demand in these sectors. From that perspective in their study, government showed one of the highest scores in resistance to change, together with education, social services, and the labour market areas. Due to these controversial views, with our sample and the exploratory questionnaire survey we will try to test whether the linear model is still valid or not in the public sector.
	PT4: Technological risk is among the most important external hampering factors in the public service innovation process.	Among other things, authors are tackling innovation from the risks and obstacles perspectives (Bhatta, 2003; Kubr, 1988). While citizens demand a modernised government, they are generally ambivalent about innovation in the public sector, particularly because innovation often involves risk-taking that can lead to significant monetary losses (Teofilovic, 2002), see also sub-chapter 2.1. As technology innovation is often driven by suppliers (vehicles, devices, telecommunications), as found by Vigoda-Gadot *et al.* (2005), this might lead towards larger technological risks. Indeed, public health systems studied in the same Publin project (see Koch and Haukens, 2005) appear to share a number of common features which could act in a way to hinder or prevent the process of innovation. Although a number of categories were identified, they were rarely mutually exclusive and one barrier may be the cause or effect of one or several others in a complex interplay. This may lead to (also technological) risk aversion with an understandable inherent resistance (which is particularly strong in the medical professions) to undertake or implement changes which may result in an increased probability of risk (to the patients in their care or to the other recipients of their services), see also chapter 3. To understand the relative importance of technological risks in comparison to other innovation hampering factors in the public sector, the topic is integrated into our empirical survey.
SYSTEMS	PS1: Innovation process in the public services is a systemic phenomenon and should therefore be analysed and managed within a broader perspective of the innovation system.	Theoretical discussions (in sub-chapter 4.4) gave us a strong argument to believe that systematic approaches can give new insights into the innovative performance of public sector and public service organisations. There is a general consensus among researchers that innovation takes place in a system consisting of individuals, firms and institutions, and within a certain cultural and regulatory framework (see Carlsson and Stankiewicz, 1993; Freeman, 1987; Goldsmith and Eggers, 2004; Edquist, 1997b; Enzing and Kern, 1999; Lundvall, 1992; Malerba, 2002a, b, c; Nelson and Rosenberg, 1993; OECD, 1997). According to Røste (2005), innovation in the public sector is systemic (Koch *et al.*, 2005 calls these systems 'innovation networks'). To be able to understand and explain innovations, all important elements shaping and influencing the dynamic of the system must be taken into account. These are not restricted to economic elements, but also organisational, institutional, social, political and legal factors, mechanisms and relations. While in the traditional literature of innovation systems (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist, 1997b; OECD, 1997) external factors are viewed on an institutional basis, in this research they are functional. This view is also supported by Radošević (1998), who stressed that systems of innovation should be defined not only in institutional terms, but also in technological terms or, more generally, in functional terms. Radošević argues that varieties of institutional set-up that do not produce effects on the technological regime are irrelevant from an economic perspective. Only institutional variety that performs different economic functions (functional variety) can be considered relevant from an economic perspective (Radošević, 2006).

	PS2: The nature of public service innovations depends on different determinants. PS2.1: The nature of public service innovations depends on the field they belong to. PS2.2: The nature of public service innovations depends on the type they are. PS2.3: The nature of public service innovations depends on the country they are from.	Mohr (1969) suggested that innovation in the public sector is the function of an interaction between the motivation to innovate, the strength of obstacles against innovation, and the availability of resources for overcoming such obstacles, which by nature differ according to particular circumstances. According to Howells and Tether (2004; sub-chapter 4.1), in the private sector there are significant sectoral differences within services in terms of the activities. In order to overcome this great diversity in service activities, a fourfold typology of different service activities and conditions was used by authors based on the different transformation processes: those services engaged in physical transformation processes (particularly of goods); those services involved in the transformation of information; those services engaged in the provision of knowledge-based services; and those services which are aimed at the transformation of people. In the innovation capacity study of voluntary and non-profit organisations (VNPOs) in the UK (see Osborne, 1996, 1998; Osborne and Flynn, 1997), the authors found that for those VNPOs which were engaged in innovative activity, it is related to the type of innovation that they are pursuing and its management implications (see chapter 3). Additionally, the National Audit Office in the UK inspected government innovations in 2006, and found in particular that central government organisations needed to improve their understanding about where the potential for innovation lies, increase the incentives for individuals to innovate, strengthen their ability to learn from one another and improve the pace at which innovations are implemented (see National Audit Office 2009). Koch *et al.* (2005) also give an example that if one country decides to provide care for elderly through publicly owned organisations, another through private and yet another through a mix of both types, then these should all be included when saying something useful about innovation in the public sector, when a functional perspective is chosen. This leads to the understanding that there should be some differences in terms of the field, type or perhaps a country the innovation belongs. This research will test this proposition in three separate stages (sub-propositions).
	PS3: Public policy effects (in their wider sense) on technological innovation in public sector services are multi-factorial and weight differently depending on the activity. PS3.1: Innovation in public sector services requires changes in laws and regulations; PS3.2: Innovation in public sector services requires contribution from public policy (in its narrow sense).	Public institutions operate under certain regulatory, social and political rules, legacy and heritage – all influencing the innovation paradigm in the public sector. According to Bloch (2010), many public sector innovations may simply be dictated either directly or indirectly from external sources like policy changes, regulations, etc. Among the long list of innovation drivers the National Audit Office (2006) also lists the importance of new government priorities, response to crisis, change in ministerial priorities, change in policy environment, changes in resource use, implementing EU policies, etc. Dunleavy *et al.* (2008) propose the following list of indicators for 'origins of innovations': how many innovations are due to EU regulations, due to ministerial or political suggestions, due to senior staff suggestions, due to middle and/or frontline staff suggestions, due to customer suggestions, due to other public sector organisations. The National Audit Office (2009) candidly concludes that innovative changes are often launched because of either political or ministerial pressures or efficiency drives. However, once this external trigger is provided, departments and agencies have a stockpile of possible innovations to hand which they use to sustain change. Authors of the National Audit Office (2009) study also state that the main barriers to innovation are a reluctance to embrace new ways of working and fragmentation within government, creating 'silos' between agencies, partly also a policy and regulation issue. Furthermore, as often the issues faced by public authorities are complex, according to Thenint (2010), the wrong policy mix can have adverse effects on overall government performance. Within the present research, we aim to test the importance of both public policy as well as regulatory influence on successful innovation projects.

	PS4: The main characteristics and driving forces of the public service innovation system do not differ across different countries.	'Innovation culture' is understood in terms of attitudes towards innovation, technology, exchange of knowledge, entrepreneurial activities, business, uncertainty (Hofstede, 2001), and related behaviour and historical trajectories. In his essay on the theoretical background that could be useful in enlightening the concept of innovation culture, Wieland (2004) conceives it as the institutions (norms, values, formal and informal) that have a significant influence on how the actors involved in an innovation process perceive economic and technical challenges and that provides them with strategies to tackle these. Indeed, Hofstede's model of national culture contained four dimensions (2001): power distance, individualism, masculinity, uncertainty avoidance, long-term orientation; with al fifth dimension added later: long-term versus short-term orientation. According to Cornford *et al.* (2006), existing evidence suggests that while the potentials of ICT are available – at least to some degree – to every region, the ways and the effectiveness with which regions exploit these potentials vary hugely across the EU territory. Indeed, as most comparative work on cultures is based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states (Didero *et al.*, 2008), see also sub-chapter 2.1. Our proposition here is to test whether the main characteristics and driving forces of the public service innovation system do or do not differ across different countries.

5.3. The survey of successful technological innovations in public sector services

After setting up the main research question, developing the research framework, related sub-research questions and the propositions, the empirical research method was chosen. It was decided to carry out the case study research in four countries based on a questionnaire. Prior to the survey, the questionnaire was tested with six international field experts as well as within the SPRU research community.

The questionnaires were sent out using e-mail and were directed to pre-identified (during the case identification process) persons, ideally the ones who were personally responsible or linked to the particular public service innovation development.[26] The e-mail based survey method allowed several advantages compared to an ordinary mail survey.

Some relative advantages of the e-mail based survey are the following (see also Fricker and Schonlau, 2002):

(a) It helps to direct concrete persons behind the development of particular innovations;
(b) It helps in achieving the maximum response rate;
(c) It raises the quality of responses;

[26] According to the OSLO Manual §450 (OECD/Eurostat, 2005), "Choosing the unit's most suitable respondent is particularly important in innovation surveys, as the questions are very specialised and can be answered by only a few people in the unit, often not those who complete other statistical questionnaires. In small units, managing directors are often good respondents. In larger units, several people are often involved, but one must be responsible for co-ordinating the replies. It is highly recommended to make a special effort to identify respondents by name before data collection starts".

(d) It helps in being precise in terms of respondent (paper-based questionnaires rarely reach the most appropriate person for a response);

(e) It allows fast feedback and respective corrections in case of wrong or incomplete contacts;

(f) It makes it possible to link the e-mail address to a particular phone number of a particular person (for reminding calls);

(g) It supports the use of the advantages of the Internet and ICT (i.e. for archiving the questionnaires);

(h) It is economical (i.e. no postal fees);

(i) It is fast (i.e. avoids intermediates, and it is simultaneous).

Due to the exploratory nature of the study, we could not use any existing databases or lists to select the cases for our survey. Therefore, cases for the survey were selected using multiple identification techniques. First, we conducted an e-mail based survey among the field experts in all four countries asking to identify any potential cases that might belong to our survey sample (according to predefined definitions; see annex 9). Experts were given instructions how to identify the potential cases. As a second step, we conducted some face-to-face interviews with certain key experts in order to identify cases they might know (as well as to discuss the survey questionnaire). The third step was an extensive survey on the Internet and publications (including so-called non-scientific 'grey literature') to identify as many public sector services as possible that fit our definition of the research subject. As a result of all these activities, 159 cases of such services with appropriate contact persons were identified in the four countries. After cleaning the list (excluding inappropriate cases, cases with poor or inadequate contact, and merging inter-linked services) we had 135 appropriate cases of technologically innovative public sector service to be included to our survey (see annex 9 for the list).

The questionnaire structure follows the logic of the research framework (see figure 5.1). While developing the questionnaire, we followed four basic principles. Firstly, to keep the questionnaire as simple as possible to fill-in. Secondly, to keep the questionnaire short, not asking anything irrelevant from the perspective of our research question and propositions. The third principle was to avoid the use of open-ended questions, which do not allow later quantitative analyses. Fourthly, to develop questions in a way that allows performing reasonable statistical analyses afterwards. The questionnaire was developed according to the best practices of similar questionnaires available. The author's own previous experiences as a Community Innovation Survey (CIS 3) project manager in Estonia were very valuable, as well as different research methods' seminars carried out during the SPRU programme.

The questionnaire developed (see annex 1) has eight sections, five of them are the core sections (B, C, D, E and F), two sections are for categorisation and background information (A and G), and one section for contact information (H).

Section A is for identifying the general framework of the case (technology innovative public sector service). It has questions about which field of public service the case belongs (A1); which part of the service the innovation influenced (A2); whether the service existed before the innovation (A3); where the innovation was developed (A4); at what level of public administration the service is provided (A5); and who is providing the service (A6). The respondents had multiple choice questions in this section, where they had to choose the most appropriate answer.

Section B (first core section) is about organisational capabilities. It has questions about which organisational capabilities the respondent's organisation improved internally in order to innovate (B1); which capabilities they obtained externally (B2); whether they have any previous experience with similar innovations (B3); and whether they had learned from the previous experiences (internal and external, positive and negative ones) while innovating (B4). The respondents had multiple choice questions in this section, where they had to choose one or several appropriate answers.

Sections C to F (four other core sections) had scale questions, where respondents were given 12-14 predefined responses. They were given a scale where 1 = not important; 2 = of little importance; 3 = important; and 4 = very important. Respondents had to rate each predefined answer on the scale. Instead of the usual scale of five choices, four choice scales were used to prevent the propensity of respondents to tick the middle box. In addition to the 12-14 predefined responses, the respondents were given one line as 'other, please specify' where they had a chance to write their own factor/response if missing in the predefined list. On the last two lines (after predefined responses and 'other') respondents were asked to indicate 'the single most important' and 'the single least important' factor/response to this question (i.e. most important goal/least important goal of innovation) – see the questionnaire in annex 1. These questions were developed in order to focus or clarify the results of the scale questions, i.e. to identify the single most or the single least important innovation influencing factor appropriate for the particular question.

Section C (second core section) concerns the goals of the innovation. In this section respondents had to answer the scale question C1 ‘what were the main goals of the innovation’.

Section D (third core section) is about support and motivations to innovate. In this section (which had two parts) respondents had to answer the scale questions D1 ‘assess the importance of different internal supporting/motivating factors for the innovation’ and D2 ‘assess the importance of different external supporting/motivating factors for the innovation’.

Section E (fourth core section) is about the obstacles to innovation. In this section (which also had two parts) respondents had to answer the scale questions E1 ‘assess the importance of different internal hampering factors faced during the innovation process’ and E2 ‘assess the importance of different external hampering factors faced during the innovation process’.

Section F (fifth core section) is about results of the innovation. In this section respondents had to answer the scale question F1 ‘assess the importance of the results of your innovation’.

Section G is for additional details to identify and analyse the case. It has questions about whether the innovation required any changes in laws and regulations (G1); was the innovation motivated or influenced by written/codified public policy (G2); does the usage of the innovation require legally valid authorisation of the user (G3); which methods are used for authorisation of the service user (G4); which were the sources of finance used to develop the innovation (G5); which methods were used to market the new innovative service (G6); has the success of the innovation been measured (G7); in terms of initial expectations, how do the respondent rate the current results of the innovation (G8). The respondents had multiple choice questions in this section, where they had to choose one or several appropriate answers.

Section H is for identifying the respondent’s details. This included name of the innovation; start of developing the innovation (year, month); time of launching the innovation (year, month); languages the service is available; the Internet address of the service; name of the organisation; respondent’s organisation (if different); name of the respondent(s); position of the respondent(s); e-mail address; telephone; fax. The respondents’ country was identified separately.

5.4. Best practice research and its limitations

Finally, the present research can be characterised as a best practice research (BPR). This method is supported by the fact that the purpose of the research was to examine the environment in which the innovation occurs, rather than to explore the innovations themselves. The main purpose of the research was to learn what the public service innovators have experienced during the development and implementation of their innovations, to share this knowledge with other policy makers and public sector leaders, as well as to contribute theoretically.

According to Overman and Boyd (1994), best practice research is the method of choice for contemporary post-bureaucratic reform theorists. Public management researchers increasingly examine 'best practices' to advocate post-bureaucratic principles of customer-driven, value-focused, entrepreneurial, market-oriented government. The authors stress that BPR and post-bureaucratic theory may be a positive, practical, prescriptive, and innovative new paradigm in public management research and theory, but numerous practical and scientific challenges remain (see also later elaborations). Broadly speaking, BPR is theoretically self-validating, non-cumulative, limited in scope, and politically skewed. The authors stress that BPR demonstrates the unique problems that arise when research and reform in public management become too closely linked. Indeed, today, best practice research is claimed to be one of the major new streams of public management research (Borins, 2001b). Inspired by Peters and Waterman's (1982) work on excellence in private sector firms, best practice researchers have increasingly attempted to identify the characteristics of successful and innovative public sector organisations (Barzelay, 1992; Osborne and Gaebler, 1992). In addition, there have been a growing number of public management innovation awards in the last two decades, and scholars have used some of the best applications in these awards as the basis for case studies. These writers have then generalised about the process of innovation and the characteristics of innovative organisations (Behn, 1988; Golden, 1990; Levin and Sanger, 1994; Borins, 2001b). Best practice research is also not new in innovation studies. For example, Rothwell (1992), who studied different innovation studies in private sector over three decade, concluded that: "Some of the many empirical studies undertaken have looked only at successful innovations, some only at failures. Others have compared successes with failures (because it controls); a number have taken the individual innovation project as the unit of analysis, while others have been conducted at the level of firm; some have considered only tactical (project

execution) variables, while others have included strategic (project selection) variables; there has been considerable sample variety in terms of size of firm, technology and industrial sector" (p. 223).

Best practice research has also faced criticism as indicated before (see for example Overman and Boyd, 1994; Lynn, 1996). According to Borins (2001b), the critique of best practice research lies with three problems: selectivity, sustainability, and comparability. He stresses that firstly, best practice researchers choose cases to illustrate predetermined conclusions, accept uncritically the self-reporting of key informants and make no attempts at external collaboration (selectivity). Secondly, they report that some organisations characterised as excellent have subsequently experienced major problems and some excellent firms have gone bankrupt. Similarly, some innovations that have won awards have subsequently been terminated (sustainability). Thirdly, critics argue that it does not compare excellent organisations to mediocre or failing ones, making it impossible to draw conclusions about the factors truly responsible for excellence (comparability). The critics advocate abandoning best practice research and returning to more conventional social science, in which theories are used to construct testable hypotheses. Out of these three, the problem of comparability is the most complicated to deal with as academics tend to study either success or failure, rather than putting the two together. There has also been a fourth line of criticism being dismissive of individual cases, arguing that they are unrepresentative and do not necessarily represent the larger sample.

Within the current research, the above-mentioned criticism towards the best practice research method is taken into account and the side effects of the method have been minimised where appropriate and possible.

6. DESCRIPTIVE ANALYSIS OF FACTORS INFLUENCING TECHNOLOGICAL INNOVATION IN PUBLIC SECTOR SERVICES

> *"All great men are gifted with intuition. They know without reasoning or analysis, what they need to know."* Alexis Carrel

The experimental survey was conducted in 2005[27] in four countries, the UK, Denmark, Finland and Estonia among pre-identified technological innovation cases (the majority of them IT-based e-services, see annex 9). A common questionnaire was used along the lines of the current understanding of public sector innovation (chapters 2 and 3), proposed research framework (chapter 4) and definitions (chapter 5). This is the first chapter presenting the results of the empirical survey of the present research. The chapter draws together the main descriptive results of the survey and conclusions are presented at the end of every sub-chapter.

The chapter is divided into the following six sub-chapters. The first section, 6.1, provides a description of the sample distribution and the response rate of the survey by countries. This is followed by the results of the basic framework of the questionnaire and descriptive results of so-called 'non-core' questions in section 6.2.[28] Thereafter, sub-section 6.3 provides descriptive results about innovation-related organisational learning in the public sector. Sub-section 6.4 then gives descriptive results about innovation goals and results in public sector services. Descriptive results about factors influencing, supporting and hampering, internally and externally, the innovation process in public sector services are provided in sub-section 6.5. Finally, sub-section 6.6 presents descriptive results about public policy effects (including the legal framework) on the development and implementation of technologically innovative public sector services.

6.1. Sample description and response rates

The final sample of research comprised 135 concrete cases of technologically innovative public sector services (i.e. units of analysis) in four countries. There were 33 cases from United Kingdom, 26 cases

[27] Results were first published in Pärna and von Tunzelmann (2007).
[28] Non-core questions are generally those not directly linked to the main research question and sub-research questions of the present research.

from Denmark, 35 cases from Finland, and 41 cases from Estonia. The questionnaires were sent out using e-mail and were directed to pre-identified (during the case identification process) persons, ideally the ones who were personally responsible or linked to the particular public service innovation development (for argumentation see the methodology in chapter 5).

After strong effort and extensive work, we received 81 questionnaires back.[29] Most of the questionnaires received were well filled in (i.e. there were very few missing values in general). From these 81 questionnaires, 15 were from the UK (response rate 45.5 per cent), 18 from Denmark (response rate 69.3 per cent), 20 from Finland (response rate 57.1 per cent), and 28 from Estonia (response rate 68.3 per cent). The overall response rate of the survey was 60.0 per cent (see table 6.1). This response rate is quite favourable compared to other surveys: in the VNPO survey (Osborne and Flynn, 1997), the cross-nation response rate was 52.1 per cent. In the later MEPIN project (see Bugge *et al.*, 2011), the response rate varied between 42 per cent in Denmark and 77.6 per cent in Iceland.

The majority of questionnaires (with only some exceptions) were sent out and received back via e-mail. In case of non-responses, up to three reminding letters with attached questionnaire were sent out (with two-week intervals). Finally, in the case of no response, a reminding call was made.

Table 6.1 Final sample and responses

Country	**Final sample** (number of cases)	**Responses** (number of cases)	**Response rate** (%)
United Kingdom	33	15	45.5
Denmark	26	18	69.2
Finland	35	20	57.1
Estonia	41	28	68.3
TOTAL	135	81	60.0

[4] For details about the survey planning and the questionnaire, see chapter 5, annexes 1 and 9.

6.2. Descriptive results of non-core questions

This sub-chapter opens up the results of the non-core questions (sections A and G) of the survey. The results are given following the general sequence of questions in the questionnaire, accommodated with appropriate tables. The results are calculated in SPSS using mainly descriptive statistics.

Question A1 – Fields of public service the technologically innovative service-cases belong to

In the literature review in chapter 2 we discussed that there is no universal categorisation of type or field of innovation in the public sector (for alternatives see Willcocks and Harrow, 1992; Okut-Uma, 2001; Baker, 2002; Howells and Tether, 2004; IDeA, 2009; Windrum, 2008). We have combined these understandings and the structure of field categories used for this survey can be seen in table 6.2. The answered sample is distributed quite equally between eight categories we used. These categories were slightly reshaped after the questionnaires were received back (this was done because of the nature of responding service-cases and the fact that we used an exploratory methodology for this research).

Out of the questionnaires received back, 13 per cent belonged to the field of 'social services', 7 per cent to 'education services', 14 per cent to 'other knowledge services', 13 per cent to 'logistical and environmental services', 9 per cent to 'business services', 8 per cent to 'personal ID services', 12 per cent were 'general administration portals', and 5 per cent 'eDemocracy related services' (see table 6.2).

Table 6.2 Distribution of responses between fields of public services

Question no.	Field of public service	Areas that the field includes (non-exhaustive)	Number of cases	%
A1.1	Social services	Social (including pensions), health and employment related services, portals, web-based databases	13	16
A1.2	Education services	Directly education related services (including online application solutions and portals, learning databases, distance and disabled learning)	7	9
A1.3	Knowledge services	General knowledge services for citizens, businesses, civil servants and other groups (legal advice and databases, counselling, web-based archives, libraries, research databases)	14	17
A1.4	Logistical and environmental services	Logistical and transport, environmental and housing related services (including journey planning, vehicles registration, driving licence, weather prediction, traffic safety, parking, public transport, land information and environment related services, portals and web-based databases)	13	16

A1.5	Business services	Taxation, customs, statistics, procurement, business and securities registry related services (all for business and/or private persons)	9	11
A1.6	Personal ID services	Personal passport, ID card and address (and other personal data) related services, applications and registry changes, and related portals	8	10
A1.7	General administration portals	General administration portals, organisational web pages, other services' infrastructures and different public information and/or service gateways (for local and international audience)	12	15
A1.8	eDemocracy services	eDemocracy, citizen participation and public relations related services (including public debate environments, influencing guides, crime reporting solutions, voting and election systems)	5	6
Total			81	100

Question A2 – Parts of the service the innovation mainly influenced

There are different typologies or ways of classifying technological solutions in public services. The normative literature agrees that there are different stages in e-government provision and governments go through a number of stages before reaching maturity (Irani, 2006). As we showed in sub-chapter 4.3, there are different frameworks developed to describe or assess the stages of e-government development (for example Gartner Group, 2000; Howard, 2001; Chandler *et al.*, 2002; Layne *et al.*, 2001; United Nations DPEPA, 2002; Silcock, 2001; Rambøll, 2004; Capgemini, 2006; Windley, 2002; Atallah, 2001; OECD, 2004; UNO, 2003; UNPAN, 2006). These frameworks tend to have three to five stages (see figure 4.10 in chapter 4), starting from simple online presence of an organisation (i.e. posting of basic information) up to seamless or fully integrated web presence of government services (i.e. integrated services, data sharing, common platform). However, due to the sample size of the present research, and to allow adequate comparison of the core results, we adopted a basic threefold structure of (1) 'front office', (2) 'back office' functions, and (3) 'both front and back office'. As we see from table 6.3, the majority of innovations influenced both the front and the back office together (71 per cent of respondents), being more transformative to the organisation. Only 27 per cent were pure front-office innovations, and only 2 per cent pure back office innovation. The latter is partly due to the fact that the emphasis of the survey was on services, which by definition have to have a client or receiver interface (with only some exception, i.e. infrastructure innovations such as ID card).

Table 6.3 Parts of service the innovation mainly influences (% of respondents)

Country	Only front office (service delivery)	Only back office (process integration)	Both front and back office
United Kingdom	53	13	34
Denmark	22	0	78
Finland	35	0	65
Estonia	11	0	89
AVERAGE	27	2	71

Note: respondents were asked which part of the service the innovation mainly influenced

Indeed, one should not over-simplify the results (the fact that innovations mostly influenced both front and back office together). On the one hand, yes, the digitalisation process of government is perhaps a once-in-the-lifetime opportunity to rethink how public sector works, how it is managed, how it is built up, how clients and citizens see it, and how back office functions are structured and run. Indeed, authors also stress (see Longford, 2002) that looking only at e-services, people tend to overstate the transformative capacity of information technology and underestimate the numerous obstacles to enhancing the quality and participatory nature of democracy, including endemic structural features of the political system, entrenched habits of government secrecy and hostility to access to information laws, the effects of neo-liberal public policy and public sector restructuring, and the recalcitrant, multiple inequalities cross-cutting the social fabric of a particular country. Therefore, e-government co-ordinators should use ICTs as a tool to facilitate change, and should not attempt to restructure public administration around current technology (see OECD, 2003b and sub-chapter 4.3).

Question A3 – The existence of services before the innovation

From table 6.4 we see that, according to the respondents view, as much as 24 per cent of services existed before the innovation, 50 per cent did not exist before the innovation, and 26 per cent only partly existed. The largest amount of services existed before the innovation in Estonia (36 per cent) and the smallest amount in Denmark (only 12 per cent). At the same time, the largest amount of services, which did not exist before the innovation was in Denmark (as much as 70 per cent), followed by Finland (55 per cent), the UK (47 per cent) and Estonia (35 per cent). Before the innovation, 33 per cent of services partly existed in the UK, 29 per cent in Estonia, 25 per cent in Finland, and only 18 per cent in Denmark. The mentioned ratio between the services which (a) existed before the innovation, (b) did not exist before, or (c) only partly existed, shows us interesting issues. Firstly, in Denmark, where

the majority of public sector service innovations did not exist before the innovation, therefore, the public service development can be considered relatively chaotic there. However, this is partly because many service-cases from Denmark were 'projects' of a larger programme, initiating service innovations in the public and non-profit sector in Northern Jutland (a region in Denmark). At the same time, the fact that as much as 36 per cent of services existed before the innovation in Estonia, indicates a more systematic perspective in public service development in this country. This more systematic service development in the public sector can represent also the maturity level of public service development. In this respect, interestingly, public service development in Finland and the UK looks less mature than in Estonia. According to our result, the public service development is slightly more chaotic in these countries as only 20 per cent of services existed before the innovation (despite the fact that these countries are developed economies where most of public services should be in place and relatively advanced). Indeed, this point can be criticised because the sample does not represent the whole picture of public sector services in respective countries. However, from the e-services side, it might give hints about the relative maturity of public service development in these countries.

Table 6.4 Service existence before the innovation (% of respondents)

Country	**Yes** (existed before)	**No** (did not exist before)	**Partly** (partly existed)
United Kingdom	20	47	33
Denmark	12	70	18
Finland	20	55	25
Estonia	36	35	29
AVERAGE	24	50	26

Note: respondents were asked did the service exist before the innovation

Question A4 – Place of innovation development

An interesting issue in innovation development is related to the question where it was developed. We have claimed in proposition PT3 that classical linear 'technology push' (see Martin, 1994) does not work in public service innovation processes. Table 6.5 illustrates the innovation development picture among the public service innovation cases of our survey. Although external cooperation does not automatically mean technology push from the supplier side, the survey results tend to support the proposition. Only 8 per cent of service-innovations in the public sector are fully developed externally;

24 per cent are developed only internally; and as much as 68 per cent are developed in cooperation between the organisation and its external partners. The only country where purely external innovation development is more active than in others is Denmark (24 per cent). The percentage of only internally developed innovations is higher in Finland (40 per cent) and the UK (33 per cent) and lower Estonia (11 per cent) and Denmark (18 per cent). Conversely, as much as 85 per cent of public service innovations in Estonia are developed in cooperation with the organisation and its external partners; Estonia is followed by the UK (67 per cent), Denmark (58 per cent), and Finland (55 per cent). The strong tendency towards external cooperation in innovation development shows that the public service innovation process happens within the broader innovation system framework. This supports proposition PS1, where we put forward that the innovation process in the public sector services is a systematic phenomenon and should therefore be analysed and managed within a broader perspective of the innovation system.

Table 6.5 Place where the innovation was developed (% of respondents)

Country	**In-house** (inside the organisation)	**Externally** (outside the organisation)	**Both** (in-house and externally)
United Kingdom	33	0	67
Denmark	18	24	58
Finland	40	5	55
Estonia	11	4	85
AVERAGE	24	8	68

Note: respondents were asked where the innovation was developed

Question A5 – The level of public administration the service is provided

From table 6.6 we see that the majority (60 per cent) of technologically innovative public sector services were provided at the national level. The national level was followed by 'international' (21 per cent), meaning that the service can be used from or are partly targeted to the international community. Only 5 per cent of services were locally provided; this was followed by 14 per cent of regionally provided services. The local and regional dimensions were relatively high in Denmark (16 and 39 per cent respectively), partly due to the reason elaborated earlier (in relation to table 6.4). The conclusions here show that public service advancements/innovations are most likely to happen at the national level. This is partly because the majority of public services are provided at the national level (i.e. taxation,

statistics, etc.) as well are most local governments subcritical in their size for proper technological innovation development. However, we know that services such as social security, health, education and transportation are whether only or partly provided at the local or sometimes regional level. Therefore, we could expect more service innovations from the local and regional level in the near future. Indeed, what we have seen from the present survey is that nationally developed services tend to be more sustainable and advanced, compared to the local or regional ones. Therefore, this leads to the conclusion that even if certain public services are locally provided, then if possible, the standardised common platform for them should be developed at the national level and then provided to all local or regional authorities simultaneously. This could compensate the usual lack of financial and human resources locally to develop great technological service-innovations; in addition, it can boost the real possible effect of the service innovation and integration across the country. Moreover, in this case, the same thing, i.e. the online registration system of as hospital, would not be developed in different places every now and then.

Table 6.6 Level of public administration the service is provided (% of respondents)

Country	**Local** (e.g. municipal)	**Regional** (e.g. county)	**National** (e.g. central government)	**International**
United Kingdom	0	7	80	13
Denmark	16	39	39	6
Finland	0	5	75	20
Estonia	4	7	54	35
AVERAGE	5	14	60	21

Note: respondents were asked at what level of public administration is the service provided

Question A6 – The entity that is providing the innovative public service

As we have seen from the theoretical parts of the present research (see chapters 2), there has been almost a century of discussions whether public services should be provided by the voluntary/non-profit sector, by public sector organisations, or by private sector entities. Table 6.7 illustrates the institutional structure of service provision among the respondents of the present survey. We see that altogether, 41 per cent of innovative services are provided directly by public entities; this is the highest in Estonia (43 per cent) and the lowest in Denmark (39 per cent). The public sector is followed by 'public and private entities in cooperation' (38 per cent). This cooperation-intensive service provision is most common in

the UK (46 per cent) and least common in Finland 30 per cent. Only private entities were providing 14 per cent of innovative public services, this is the highest in Finland (25 per cent) and the lowest in the UK (7 per cent). Academic and non-profit institutions are relatively unimportant in providing technologically innovative public sector services (1 per cent and 6 per cent respectively). The relatively high importance of public-private cooperation in service provision (38 per cent of all services) also supports proposition PS1, where we claim that the innovation process in the public sector services is a systematic phenomenon and should therefore be analysed and managed within a broader perspective of the innovation system. However, the high intensity of private-public cooperation in service provision stresses a wide practice of highly formalised cooperation agreements between the public and the private sector. On the other hand, the fact that as much as 41 per cent of service innovations are provided directly by the public sector, also indicates a strong need for less formal cooperation practices within the innovation system, which might be based on many little agreements, but also on personal level day-to-day interaction. The overall cooperation necessity is also supported by Borins (2001b), who while asking the respondents of his study what was innovation in their programme, discovered that the most frequent characteristic, observed in approximately 60 per cent of programmes, was 'holism', namely that the innovation depended on inter-organisation cooperation, that it delivered multiple services to individuals, or that it took a systems approach to a problem (see chapter 3). From a critical perspective, one could say this extensive inter-organisation cooperation marginalises the role of the project leader or champion and might lead to poor quality of the result as responsibilities are too disperse.

Table 6.7 Institution that is providing the innovative service (% of respondents)

Country	**Public entity** (including under private law)	**Private entity**	**Public & private entities in cooperation**	**Non-profit institution**	**Academic institution**
United Kingdom	40	7	46	7	0
Denmark	39	11	33	11	6
Finland	40	25	30	5	0
Estonia	43	11	42	4	0
AVERAGE	41	14	38	6	1

Note: respondents were asked who is providing the innovative service

Question G5 – The sources used for financing the public service innovation development

As this sub-chapter analyses the results of the non-core questions (sections A and partly section G), we will continue with section G question 5 from here. We know from many studies from the private sector, but also from the public sector (e.g. Koch *et al.*, 2005), that lack of finances is usually named as the number one barrier for innovation development. We analyse whether this is or is not true in the public sector in the later stages of the empirical analysis. However, table 6.8 illustrates the sources of finance in the public sector to finance the service innovation development. We see that in exactly half of the cases (50 per cent), the source of finance has been the ordinary public annual budget. This was highest in Finland (60 per cent), followed by Estonia (57 per cent), the UK (53 per cent), and finally Denmark with only 24 per cent. The next important source of financing was "national, regional or local funds or specific programmes" (34 per cent). The importance of this source was the highest in Denmark (65 per cent), followed by Finland (40 per cent), the UK (27 per cent), and Estonia (with only 14 per cent). These two most important sources of finance were followed by "especially extended public annual budget" (23 per cent). The extended budget was the most used in Denmark (35 per cent), followed by Estonia (25 per cent), Finland (20 per cent), and the UK (only 7 per cent). From the other sources of finance, "international funds or specific programmes" have been financing 14 per cent of the service innovations, and "loan and leasing" only 1 per cent. About 11 per cent of cases of public service innovations were financed through "other" sources. These conclusions show that the multiplicity of sources of finance tend to be important for public service innovation development. However, what we have seen during this survey is that systematic development in public services is more sustainable and effective than chaotic. We can extend this finding to the conclusion that continued and systemic methods of public service innovation financing should be preferred to any ad hoc or random methods of spreading resources. We also support the view that the development of both managerial and technological innovations in public services should be overwhelmingly financed through the natural process of public budgeting, not through separate programmes/projects. Moreover, to finance cross-institutionally seamless government services and shared infrastructure, budgetary regulations should facilitate co-operative funding mechanisms (OECD, 2003b). Related to that, organisations also need incentives for cross-organisational projects and tools for measuring returns of investment.

Table 6.8 Sources of finance (% of respondents)

Country	Ordinary public annual budget	Specially extended public annual budget	Loan or leasing	National, regional or local funds (or specific programmes)	International funds (or specific programmes)	Other
United Kingdom	53	7	7	27	0	13
Denmark	24	35	0	65	12	0
Finland	60	20	0	40	10	10
Estonia	57	25	0	14	25	18
AVERAGE	50	23	1	34	14	11

Notes: (1) respondents were asked which sources are used to finance the development of the innovation; (2) it was possible to select more than one answer to this question.

Question G6 – Methods used to market the new innovative service

The concept of marketing has conventionally been viewed by public service professionals as inappropriate to organisations concerned with the delivery of public good services (see Laing, 2003). However, the adoption of private sector based approaches to the organisation of public services in many post-modern western economies has forced a fundamental reconsideration of the potential contribution of marketing to the delivery of public services and related innovations. This is not the core focus of the present research, however, looking at the tools used for the marketing of newly developed public service-innovations, we first see a high proportion of offline methods (i.e. booklets, newspapers; 79 per cent). Offline methods were used most often in Finland (in 95 per cent of service cases), followed by Denmark (82 per cent), the UK (80 per cent), and Estonia (64 per cent). Online methods were the next important marketing tool (used by 66 per cent of service cases). These were most often used in the UK (73 per cent), followed by Denmark and Finland (both 65 per cent), and Estonia (64 per cent). Only 13 per cent of service cases used other methods for marketing, and 8 per cent did not use marketing (see table 6.9). As public services are not homogeneous (rather, they are characterised by a high degree of diversity) we cannot make a simple conclusion here. Indeed, as we see that offline methods are prevailing over online methods, one might expect more novelty in introducing new or improved services to their current and/or potential customers by public institutions.

Table 6.9 Methods of marketing the new innovative service (% of respondents)

Country	**Offline methods** (booklets, newspapers, etc.)	**Online methods** (banners in web-pages)	**Via satisfied costumers** (i.e. face-to-face)	Other	**No marketing used**
United Kingdom	80	73	40	0	13
Denmark	82	65	59	12	0
Finland	95	65	75	15	5
Estonia	64	64	50	18	11
AVERAGE	79	66	56	13	8

Notes: (1) respondents were asked which methods were used to market the new innovative service; (2) it was possible to select more than one answer to this question.

6.3. Innovation-related organisational learning in public sector

"You can be discouraged by failure, or you can learn from it. So go ahead and make mistakes, make all you can. Because, remember that's where you'll find success - on the far side of failure," said Thomas J Watson, Sr. (founder of IBM). From the mainstream literature on innovation (based on the private sector, mainly the manufacturing industry) we know that learning has a crucial role in an organisation's innovativeness (see also respective discussions in chapter 4). According to Lundvall (1992), the fundamental resource in the modern economy is knowledge and, accordingly, the most important process is learning. It is equally important to improve one's internal capabilities, as well as to learn externally – from competitors, from different knowledge bodies (e.g. academic institutions) – locally, nationally and internationally. It is important to learn from one's own mistakes or those of others, and to discover any available best practices appropriate to improve one's own processes, products and services. Moreover, it is also important to have close relationships with external partners, e.g. technology providers and user representatives.

As seen above and discussed earlier in this research, several determinants are important when talking about organisational learning. Sub-research question 2 (SRQ2) asks "Which managerial and organisational improvements are necessary to innovate in public sector services?", and sub-research question 3 (SRQ3), "What is the importance of technological knowledge in the public service

innovation process, where and how it is developed?" In the current sub-chapter, we assess the following parameters of organisational learning (see also statistical output tables in annex 4):

(a) Which organisational capabilities did the organisations internally improve in order to innovate;
(b) Which capabilities did the organisations obtain externally in order to innovate;
(c) Did the organisations have any previous experiences with similar innovations;
(d) Did the organisations learn from the previous experiences while innovating (internally and externally; from positive and negative ones).

Not all the new ideas are generated inside the focal organisation; some are generated externally but are adopted by the organisation (Damanpour and Gopalakrishnan, 1998). The better the actors at developing networks that can help them get access to the relevant competences and partners that can help them in their learning processes, the greater the chances that their innovation processes will succeed (Kemp and Weehuizen, 2004; see chapters 2 and 3). Table 6.10 shows the importance of different internal capabilities that organisations improved in order to innovate. We see that the most important of these are technological knowledge (69 per cent of all respondents) and project management skills (64 per cent). Relatively less important were improvements in general management skills (34 per cent), organisational structure (28 per cent) and motivation systems of personnel (15 per cent). The importance of internally improved capabilities was similar across all countries in the survey. These results support the views of Røste (2005), who states that the cumulative accumulation of knowledge and skills, i.e. the whole learning process, is crucial for innovation in the public sector. A similar finding is supported by Koch and Haukens (2005), who claim that in order to learn and innovate the actors in public sector must interact with other actors, this being people, organisations or various sources of information; see sub-chapter 4.4.

Table 6.10 Improvements of intra-organisational capabilities in order to innovate (% of respondents)

Country	**General management skills**	**Project management skills**	**Technological knowledge**	**Organisational structure**	**Motivation system of personnel**	**Other**	**None**
UK	40	73	73	33	7	7	7
Denmark	41	76	65	41	29	6	0
Finland	20	45	65	20	20	5	15
Estonia	36	64	71	21	7	0	4
AVERAGE	34	64	69	28	15	4	6

Note: it was possible to select more than one answer to this question.

Therefore, looking at table 6.11, we see that from the externally obtained knowledge perspective, the single most important externally obtained capability is technological advice and support, which in some cases is surely related to ICT outsourcing (81 per cent), far ahead of project management advice and support (21 per cent) and management advice and support (11 per cent). External technological advice and support was highly used in all countries (from 76 per cent in Denmark to 87 per cent in the UK). Kemp and Weehuizen (2004) also distinguish between three different types of learning: technical learning (about instruments), conceptual learning (about goals and strategies) and social learning (about societal values, responsibilities, appropriate ways of interacting and policy approaches), see sub-chapter 2.3. However, they did not differentiate the relative importance of different knowledge areas, which we have done here. Indeed, despite the dominant position of technological advice and support, we have to admit that this might be partly related to the fact that the survey sample consisted only of technological innovation and did not focus on other innovation areas (i.e. organisational innovations).

Interestingly, although only 8 per cent of service-innovations in public sector were fully developed externally (see table 6.5), the fact that as much as 81 per cent of innovators obtained external technological advice and support, indeed, tends to question proposition PT3 that classical 'technology push' does not work in the public service innovation process, therefore we only partly accept the proposition. However, we have to accept fully proposition PT1 that technological knowledge is the major element improved internally and obtained externally in the development process of public service innovations. Despite some differences between countries, whether technological knowledge or project management skills were the most important internally improved capability for innovation, overall, the results show that the most important intra-organisational capabilities improved by the innovating organisations was technological knowledge (69 per cent of respondents; see table 6.10) and table 6.11 shows that technological advice and support was the single most important externally obtained capability for innovation. The purpose of our research was not to study organisational success, however, the results are somewhat contrary to the experiences of Damanpour *et al.* (2009), who found that organisational success in the UK public service organisations does not follow a technological trajectory and depends on the adoption of both technological and non-technological innovations. Their analysis provided empirical evidence for this view and demonstrated that the co-adoption of service, technological process, and administrative process innovations influence organisational performance in public service organisations.

Table 6.11 Externally obtained capabilities to innovate (% of respondents)

Country	**Managerial advice /support**	**Project management advice /support**	**Technological advice /support**	**Human resource management advice/support**	**Other**	**No external capabilities were obtained**
UK	33	27	87	0	7	7
Denmark	0	18	76	6	12	6
Finland	0	25	80	0	5	15
Estonia	14	18	82	11	0	7
AVERAGE	11	21	81	5	5	9

Note: it was possible to select more than one answer to this question.

According to Bloch (2010) the willingness to take on risk and the ability to learn from failures are important issues for public sector innovation and this motivates gaining more information on failures, both implemented changes (innovations) that did not meet their objectives or had negative impacts, and innovation projects that were abandoned. Table 6.12 shows whether the organisations had any previous experiences with similar innovations. We see that 53 per cent of responding organisations had previous positive experiences with similar innovations; only 11 per cent of respondents reported having previous negative experiences. As much as 45 per cent of responding organisations had no previous experiences, positive or negative, with similar innovation (this was highest in Estonia – 54 per cent and lowest in Denmark – 35 per cent). Previous positive experiences were most encountered in Denmark (65 per cent) and least in Estonia (46 per cent). Negative experiences were most often faced in Finland (20 per cent) and least in Denmark (6 per cent). These results are relatively volatile, showing that innovators had only little more previous positive experiences than no experiences. Surprisingly, negative previous experiences did not exist by most of the respondents while developing innovations. Even if every innovation is different from another, one might still expect that service providers in the public sector would put more emphasis on learning from mistakes and failures. This is especially appropriate in case of large technology projects, which, according to the literature, fail or are over-budget and over-deadline every now and then (see sub-chapter 4.3).

Table 6.12 Existence of previous experiences with similar innovations (% of respondents)

	Yes, positive experiences	**Yes**, Negative experiences	**No**
UK	53	13	40
Denmark	65	6	35

Finland	50	20	45
Estonia	46	7	54
AVERAGE	53	11	45

Note: it was possible to select more than one answer to this question.

Table 6.13 shows whether the organisations had learned from previous experiences (within the organisation and outside) while innovating. Learning from previous positive experiences seemingly dominates any learning from previous negative experiences. We also see that organisations are slightly more likely to learn from others than from their own previous experiences: 43 per cent for the former and 39 per cent for the latter in terms of positive experiences, 23 per cent and 21 per cent respectively from previous negative experiences. When comparing different countries, we see that in the UK and Denmark organisations most often learned from their own positive experiences, while in Finland and Estonia organisations were more open to positive experiences of others; and similarly for learning from negative experiences. We know that a key determinant of relative success or failure is the ability to manage the learning cycle (see Hale, 1996; Bowen, 1994; Hayes *et al.*, 1988; Maidique *et al.*, 1985). In addition to intra-organisational learning, it has two directions: dissemination (outbound) and learning (inbound), see Bloch, 2010. This external dissemination of knowledge has growing importance, contrary to the statement of Bason (2010), that many public sector organisations are still essentially navigation blind when it comes to real-time, relevant management information on performance and applying past experiences and best practices available.

Table 6.13 Learning from previous experiences while innovating (% of respondents)

	Yes, from previous negative experiences within the organisation	**Yes,** from previous positive experiences within the organisation	**Yes,** from previous negative experiences outside the organisation	**Yes,** from previous positive experiences outside the organisation	**No**
UK	33	53	27	33	13
Denmark	18	35	6	29	24
Finland	35	45	35	55	15
Estonia	7	29	21	46	21
AVERAGE	21	39	23	43	19

Note: it was possible to select more than one answer to this question.

6.4. Goals and results of technological innovation in public sector services

The goals of innovation are easier to talk about than to define. In the literature, there are mixed views whether innovation in the public sector occurs similarly or different from the private sector. From time to time private management methods have been preferred to the traditional public sector ones, and vice-versa. Bryer (2006) also says that public organisations, more than private organisations, must deal with multiple stakeholders and potentially conflicting demands. How they balance the demands of multiple stakeholders will have consequences for their activities, outcomes, and the degree of trust in them by the public. Our claim here is that innovation in the public sector occurs differently; innovation goals in the public sector differ from the private sector mainly because of non-existing competition (no need to improve competitiveness) and relatively weak financial pressure (no need to generate profit). In chapter 2 we analysed the differences between the public and private sector innovation processes and saw that the current knowledge about innovation goals in the public sector is very fragmented. In addition to more typical private sector motives such as competition and efficiency, researchers claim that the principle factor for innovation is simply to put useful ideas into action, as well as to react to funding crises, technical changes, as well as to burgeoning demand from the user side (see Zegans, 1997). Mulgan and Albury (2003: 3) define innovation simply as "new ideas that work". However, the new ideas that work at creating public value can mean many different things – new ways of organising things (like public-private partnerships), new ways of rewarding people (like performance related pay) or new ways of communicating (like ministerial blogs) (Mulgan, 2007).

As seen above and discussed earlier in this research, there might be several reasons why innovation in the public sector takes place. In the present survey, we assessed the following:[30]

(a) What are the goals and the results of technological innovation in public sector services?
(b) How would it seem if we compare the initial innovation goals with the innovation results the public service organisations achieved?
(c) Whether and how has the success of technological innovation in public sector services been measured?

[30] See statistical output tables and charts about the goals and results of innovation in annex 5; and about results compared to initial expectations in annex 3.

(d) How would it seem if we assess the innovation results of the selected organisations against the initial expectations the organisations had (on a four-point scale – excellent, good, average or poor)?

Despite the innovation goals in the private sector (services) being skewed towards the quality issues (see Howells and Tether, 2004; sub-chapter 4.1), due to multiple values and goals in the public sector (Willcocks and Harrow, 1992; sub-chapter 2.2), there is a reason to believe that possible goals in the public sector services are much more polar ones. Grout *et al.* (2003; sub-chapter 2.2) also stress that the typical concern is that publicly controlled organisations, not subject to the discipline of the competitive market, may therefore lack incentives to control costs or provide quality of service and respond to the needs of consumers. However, figure 6.1 illustrates the multidimensionality of innovation goals in public services, and the results are different from what we expected.[31] On average (across the countries) the most important innovation goal has been to respond to user needs (3.52 on a scale of 4), followed by improvements in service quality (3.49), to go online (3.43), and to improve the take-up of the service (3.3). The least important innovation goal has been to gain social or political popularity (2.21), followed by improvements in the organisation's competitiveness (2.24), improvements and changes in organisational behaviour (2.37), and reducing the service cost (2.53). We can also identify different country patterns in terms of their innovation goals. For example, in Estonia the most important innovation goal was to reduce the time spent on service delivery (3.57), while in Finland and the UK it was to go online (3.76 and 3.53 respectively), and in Denmark to improve transparency (3.59). Looking at the general picture of innovation goals across countries we see that transparency issues are more important in Denmark than in other countries; the service cost issue is more important in the UK; and the service diversity issue is relatively more important in Estonia and relatively less important in Finland.

In order to clarify the results, the respondents were also asked to name the single most and the single least important innovation goal. The results were clearer but slightly different from the previously described scale question. Twenty-five per cent of respondents named 'to improve the quality of the service' as the single most important innovation goal, followed by ' going online' pointed by 15.8 per cent of respondents, and 'to respond to user needs' by 14.5 per cent of all respondents. This

[31] The assessment was made on a four-point scale, where 1 was "not important", 2 "of little importance", 3 "important", and 4 "very important".

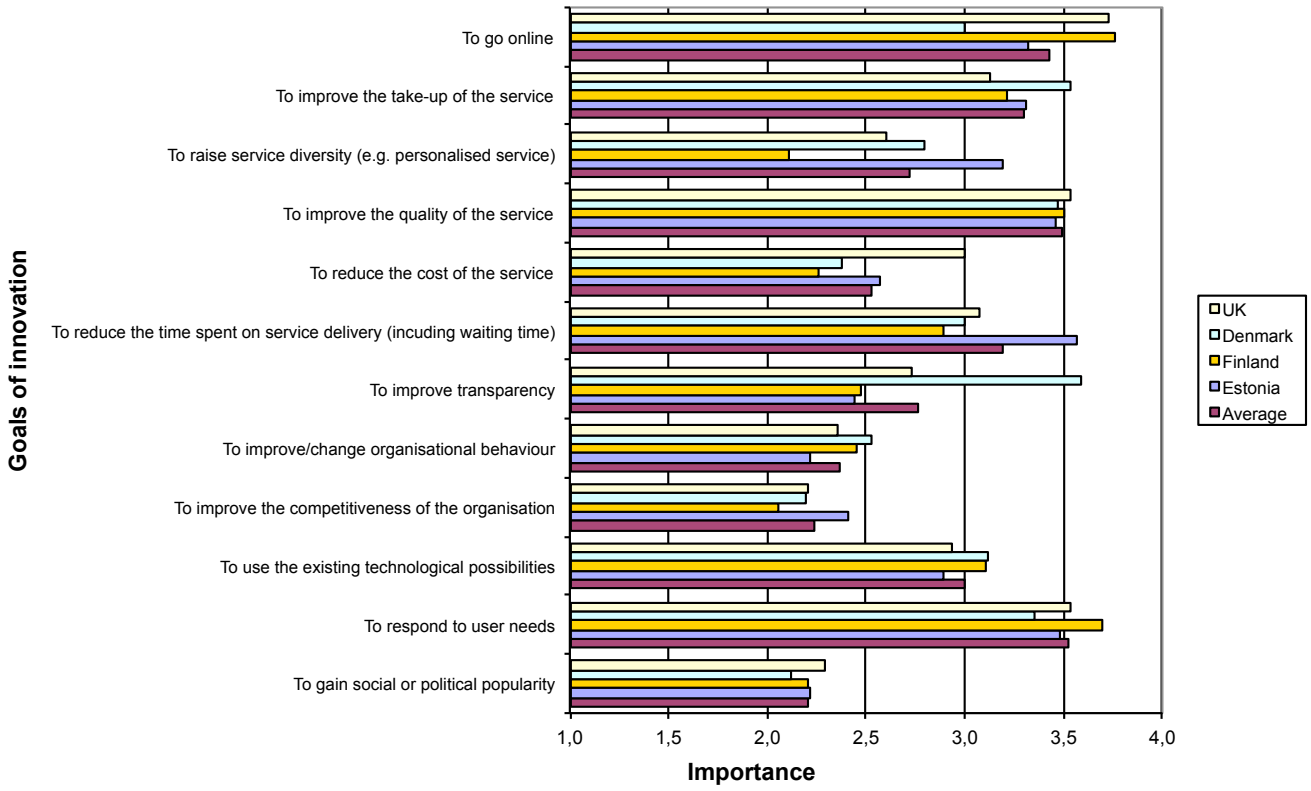
clarification question emphasises slightly more the importance of quality issues versus user demand related issues. Country patterns are relatively similar to the scale question described earlier, i.e. transparency issues are relatively important in Denmark; user needs are important in Finland; while service diversity, delivery time, and take-up issues are important in Estonia.

While asking about the single least important innovation goal, as much as 33.8 per cent pointed to 'gaining social or political popularity', 21.6 per cent named 'to improve or change organisational behaviour', and 18.9 per cent 'to improve the competitiveness of the organisation'. This is similar to what we saw in the scale question. From a single country perspective, 'gaining social or political popularity' was strongly the least important innovation goal in the UK (57.1 per cent) and Denmark (46.7 per cent), while in Finland and Estonia other aspects were considered as least important innovation goals. In Finland, competition issues were equally unimportant innovation goals as social or political popularity (both 27.8 per cent), while in Estonia organisation behaviour improvements (25.7 per cent) and competitiveness issues (22.2 per cent) were much less important innovation goals than social or political popularity (18.5).

Indeed, we remain neutral in terms of proposition PM2 that innovation goals in the public sector are equally polarised. Although the responding organisations had many different innovation goals, cumulatively, the major ones are clearly drawn out: improvements in service quality, going online, responding to user needs, and improving the take-up of the service (see figure 6.1).

However, based on these result, we should accept proposition PM1 stating that factors (including goals) influencing the innovation process in public sector services differ to some extent from the ones we know from the private sector. Competitiveness and service cost, which are important innovation drivers in the private sector, were both among the least important innovation goals rated by the respondents, see figure 6.1. This contrasts the findings of Borins (see 2001c and chapter 3) that a common denominator of all the characteristics of public sector innovation is that they look very much like the private sector.

Figure 6.1 Goals of innovation in public sector services (Question C1)



Note: scale 1 = not important; 2 = of little importance; 3 = important; 4 = very important.

From a statistical significance perspective within the innovation goal question (see figure 6.2), we see that all possible goals are significantly different at least from another goal. Nevertheless, when we look at the error bar, we see that many goals are with overlapping means. This gives evidence that the importance of different innovation goals is relatively homogeneous, i.e. many goals are performing similarly. Therefore, in the latter stage of our analysis, we try to group similarly performing innovation goals in order to find out common denominators describing and clarifying the picture of possible innovation goals in public sector services. The statistical significance of country differences within each innovation goal is given in the latter stage, when the goals are grouped (i.e. after principal component factor analysis, see chapter 7).

Figure 6.2 Statistical significance of differences in innovation goals (Question C1)

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
C1.1	31,158	76	,000	3,43	3,21	3,65
C1.2	29,712	76	,000	3,30	3,08	3,52
C1.3	23,404	75	,000	2,72	2,49	2,96
C1.4	50,629	79	,000	3,49	3,35	3,62
C1.5	22,345	76	,000	2,53	2,31	2,76
C1.6	31,908	77	,000	3,19	2,99	3,39
C1.7	23,828	77	,000	2,76	2,53	2,99
C1.8	21,935	77	,000	2,37	2,16	2,59
C1.9	20,285	74	,000	2,24	2,02	2,46
C1.10	31,230	76	,000	3,00	2,81	3,19
C1.11	47,569	78	,000	3,52	3,37	3,67
C1.12	19,811	76	,000	2,21	1,99	2,43

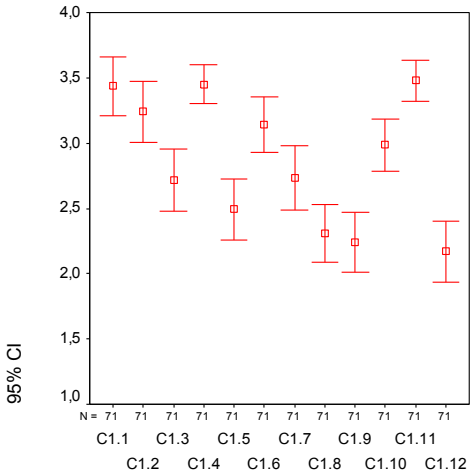
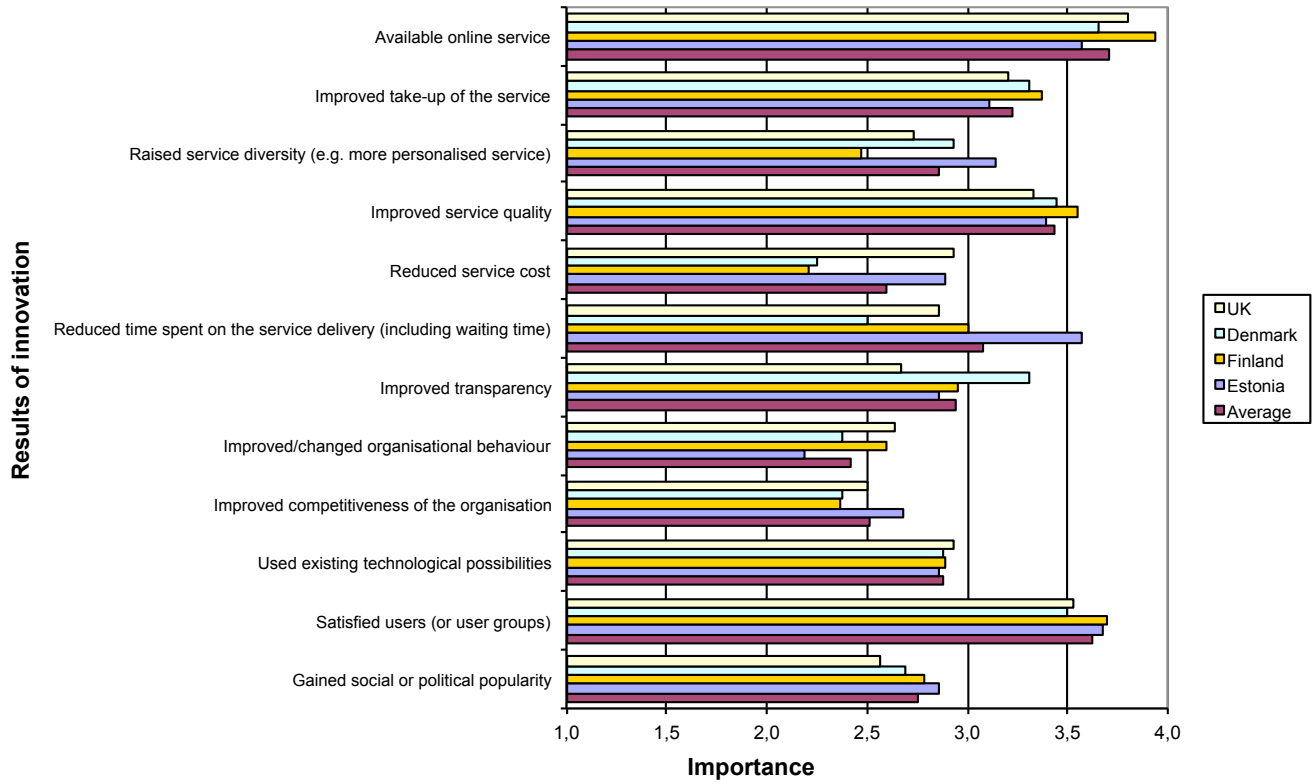


Figure 6.3 illustrates the patterns of innovation results in public services**.** In general, the pattern of results is similar to that of innovation goals. On the one hand, this gives some evidence that, in general, the innovation results are similar to what was initially expected (i.e. in comparison to innovation goals). Alternatively, this may indicate aspirations rather than outcomes (see figure 4.13 in sub-chapter 4.4) given that the respondent and the data source were the same. Koch and Haukens (2005) also support the need for external evaluation, stating that the introduction of any innovation should require close *ex ante* assessment, coupled with careful review and evaluation. Finally, there are still some differences between the importance of reported innovation goals and innovation results; these can be followed in annex 5.

Figure 6.3 Results of innovation in public sector services (Question F1)



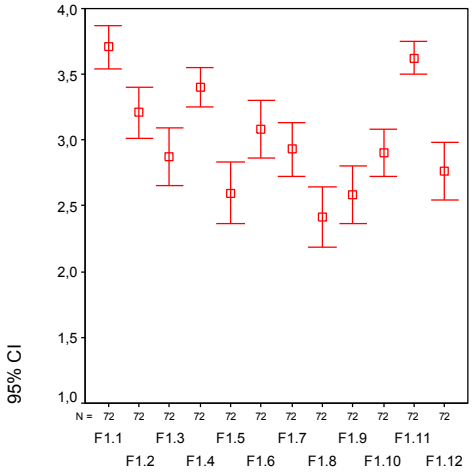
Note: scale 1 = not important; 2 = of little importance; 3 = important; 4 = very important.

When looking at the innovation results question from a statistical significance perspective (see figure 6.4), we see that, similarly to innovation goals, all possible results are significantly different at least from another result. Nevertheless, when we look at the error bar we see that many results are with overlapping means. This gives evidence (similarly as for innovation goals) that the importance of different innovation results is relatively homogeneous, i.e. many results are performing similarly. Therefore, in the latter stage of our analysis, we try to group similarly performing innovation results in order to find out common denominators describing and clarifying the picture of possible innovation results in public sector services. The statistical significance of country differences within each innovation result is given in the latter stage, when the innovation results are grouped (i.e. after principal component factor analysis, see chapter 7).

Figure 6.4 Statistical significance of differences in innovation results (Question F1)

One-Sample Test

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
F1.1	47,545	76	,000	3,71	3,56	3,87
F1.2	34,773	77	,000	3,23	3,05	3,42
F1.3	26,617	76	,000	2,86	2,64	3,07
F1.4	48,080	78	,000	3,43	3,29	3,57
F1.5	23,333	76	,000	2,60	2,38	2,82
F1.6	29,086	76	,000	3,08	2,87	3,29
F1.7	29,209	77	,000	2,94	2,74	3,14
F1.8	21,380	76	,000	2,42	2,19	2,64
F1.9	22,404	76	,000	2,51	2,28	2,73
F1.10	32,975	77	,000	2,88	2,71	3,06
F1.11	62,602	78	,000	3,62	3,51	3,74
F1.12	25,864	76	,000	2,75	2,54	2,97



When comparing innovation goals (Question C1) and innovation results (Question F1), we see that even if the questionnaire and the questions were filled-out by the same person, and at the same time, there still are some statistically significant differences (i.e. the importance of different innovation goals was weighted differently from the results realistically achieved). From the paired sample T-test (see annex 8) we see that out of the twelve possible innovation goals and results, five were statistically significantly different, and all of them towards the results which were weighted as more important than the initial goals. This means that the results 'available online service', 'improved transparency', 'improved competitiveness of the organisation', 'satisfied users (or user groups)' and 'gained social or political popularity' were all weighted as significantly more important than their respective initial goals. This phenomenon illustrates the situation where the innovation goals initially set up may actually differ statistically significantly from the results of a particular public service innovation. Nevertheless, one should keep in mind that the described goals and results which differed significantly from each other were neither all the most or the least important when the respondents rated the importance of innovation goals and innovation results (see figures 6.1 and 6.3).

Most of the organisations in the survey measured the success of their innovations (see table 6.14). The majority of them used automatic features of their systems to track user performance (52 per cent); this was highest in the UK (67 per cent) and lowest in Estonia (43 per cent). In terms of importance, the next tool used for user performance identification was the online user questionnaire (38 per cent),

followed closely by offline user questionnaires. Online user questionnaires were again most used in the UK (60 per cent), followed by Finland (45 per cent) and Denmark (33 per cent). Offline user-questionnaires were used by less than half of the respondents (40 per cent) both in the UK and in Finland. Finland was also a strong user of other kinds of measurement tools (45 per cent). Interestingly, no user-performance measurement was used by 29 per cent of Estonian organisations; this percentage was much lower in other countries (in the UK 6 per cent; Denmark 7 per cent; Finland 5 per cent). Nevertheless, the latter might be due to the fact that Estonian public service innovations in the survey are relatively new (mostly developed around 2004). Indeed, the most 'productive' starting year for developing public service innovations in general was 2000 (the development of 24 per cent of the cases in this survey started this year), followed by 2002 (18 per cent) and 2003 (18 per cent).

Table 6.14 Measurement of innovation success (% of respondents)

Country	**Success measured by identifying user-performance automatically**	**Success measured by online user questionnaires**	**Success measured by offline user questionnaires**	**Success measured by other methods**	**No result measurement used**
UK	67	60	40	7	7
Denmark	56	33	33	17	6
Finland	50	45	40	45	5
Estonia	43	25	25	7	29
AVERAGE	52	38	33	19	14

Notes: (1) the respondents were asked whether the 'success' of their innovation has been measured; (2) it was possible to select more than one answer to this question.

Responding organisations rated the success of their innovations very highly (see table 6.15). Compared to the initial expectations, 30 per cent rated their innovation results as excellent and 61 per cent as good, meaning that 91 per cent of respondents consider their innovations to be relative successes. Only a small minority rate their results as average (8 per cent) or poor (1 per cent). This relatively good evaluation is partly due to the fact that it was best practice research by its nature, and partly because it is hard (and maybe not possible) to find any (common) quantitative measures to measure the innovation success in public sector (compared to the private sector where return on investment, sales or productivity measures can be used). The UK is the most confident country in terms of rating the innovation results: almost half (47 per cent) of responding organisations felt their innovation results

were excellent. Most pessimistic results was in Estonia, where only 18 per cent of cases were rated as excellent, 64 per cent as good, 14 per cent average, and 4 per cent poor. Based on the discussions above, we have to reject proposition PM3 that innovation goals in the public sector are technically achieved (i.e. technologically innovative service exists), but the ways in which they are successful are below the initial expectations (rated as average or poor).

Table 6.15 Innovation results compared to initial expectations (%)

Country	Excellent	Good	Average	Poor
UK	47	40	13	0
Denmark	29	71	0	0
Finland	35	65	0	0
Estonia	18	64	14	4
AVERAGE	30	61	8	1

Note: the respondents were asked how do they rate the current results of their innovation, compared to the initial expectations

6.5. Factors influencing successful technological innovations in public sector services

While developing the theoretical research framework, from a management perspective, we decided to use the basic understandings of the innovation management literature (see for example Rothwell 1977, 1992; Tidd *et al*., 2001), which is based on systematic analysis of private sector innovation studies since 1950s. According to Rothwell (1992: 224), "Success is multi-factored. Studies show that, in general, successful innovators outperform failures across the board. There are no simple single-factored explanations". Therefore, success is a matter of competence in all functions, and of balance and coordination between them, and not of doing one or two things brilliantly well (Cooper and Kleinschmidt, 1988). Rothwell (1992) also notes that the success factors are more or less common to all industries, although their rank order or importance can vary from sector to sector. For his summary of different innovation influencing factors, as well as for other materials from the innovation management perspective, see sub-chapter 4.1.

Previous conclusions about different factors influencing successful innovations belong to the private sector, primarily to manufacturing. Borins (2001b), supports the idea that innovation supporters in

public sector organisations are also always multi-factorial. However, which of the factors are more important, which less? Perhaps the public sector has some additional factors and some of the given factors do not work so well in the public sector? This question is in line with the main research question (RQ) of the thesis "What is relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of public service innovation system in four European countries", as well as with the sub-research question SRQ1, "What are the key-features influencing, supporting and hampering, the development and implementation of successful, technologically innovative public sector services".

The current research (and the survey it is based on) is carried out in order to give more 'ground-level' answers to these questions.

In this sub-chapter, we carry out the following analyses:[32][33]

(a) What is the importance of different internal supporting and hampering factors influencing the technological innovation process in public sector services;
(b) What is the importance of different external supporting and hampering factors influencing the technological innovation process in public sector services;
(c) Importance comparison of internal supporting factors versus external supporting factors;
(d) Importance comparison of internal hampering factors versus external hampering factors;
(e) Importance comparison of internal factors versus external factors;
(f) Importance comparison of supporting factors versus hampering factors.

Figure 6.5 illustrates the importance of different internal factors supporting innovation in public sector services (by country). On average (across countries) the most important factor is personal leadership or existence of 'key' individuals (3.42), followed by top management commitment and support, and open-minded managers (both 3.19). Indeed, the prominent position of personal leadership might be slightly biased, as mostly persons who were responsible or linked to the particular public service innovation development filled in the questionnaires. To continue, close cooperation with technology suppliers and good knowledge of existing technologies were also rated as being important (both 3.16). Conversely, the least important factors were hierarchical (top-down) power (2.06) and flexible organisational structures (2.49). From a single country perspective, the pattern was quite homogeneous. Nevertheless,

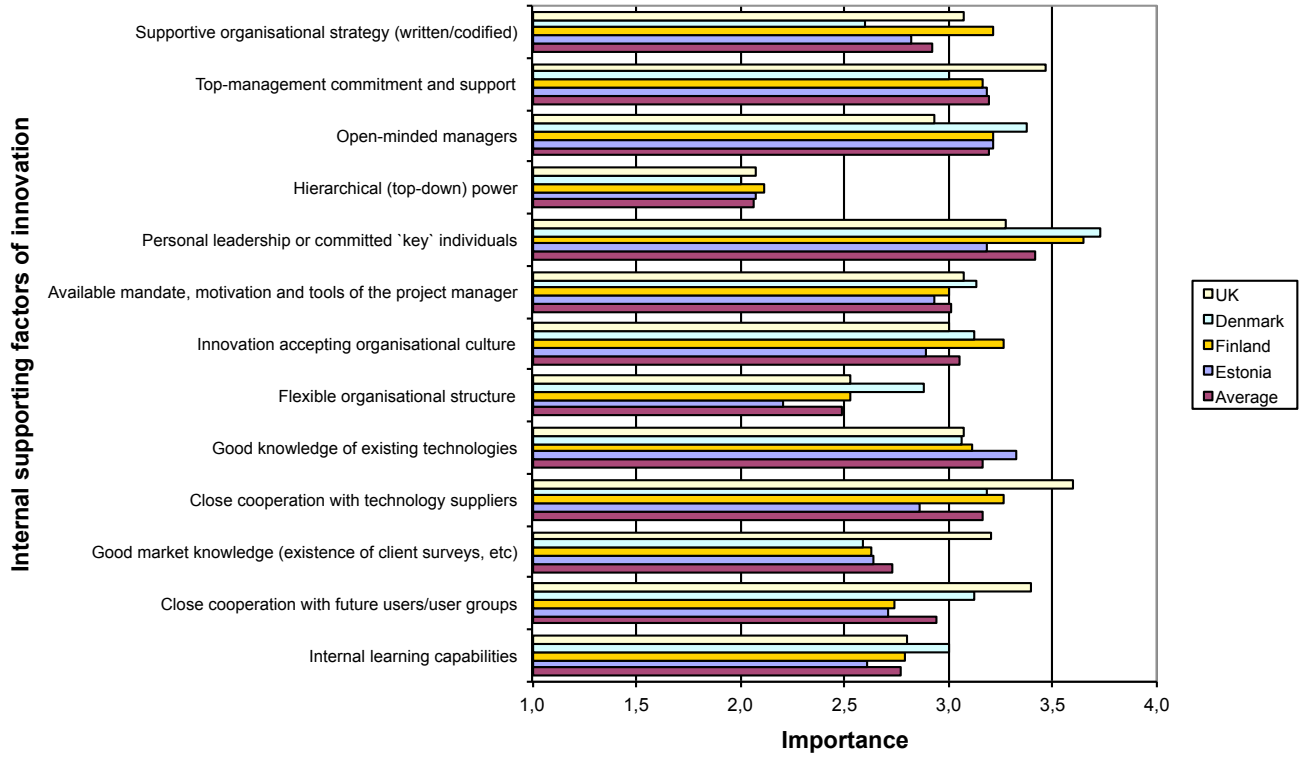
[32] This section only considers the country as a determinant of factors influencing the development process of public service innovation. Other possible determinants will be analysed in the latter stages of this thesis, after we have performed principal component factor analysis for grouping the factors.
[33] Statistical output tables and charts of these issues are in annex 6 and in annex 7.

from the perspective of supporting factors, the UK slightly exceeded other countries in terms of management commitment and support, cooperation with technology suppliers, cooperation with future users, and good market knowledge. In Denmark, the internal learning capabilities and flexible organisational structures were slightly more important than in other countries. All countries rated hierarchical top-down power as the least important factor supporting innovation in public sector services.

In order to clarify the results, the respondents were also asked to name the single most and the single least important internal innovation supporting factor. The results were clearer but slightly different from what we saw from the previously described scale question. Across countries, the single most important factor was clearly personal leadership or existence of 'key' individuals (28 per cent of respondents), followed by supportive organisational strategy (14.7 per cent) and top management commitment and support (12 per cent). Compared to the previous scale question we see that the latter two factors have changed their places. From a single country perspective, only the UK did not have personal leadership as the most important factor; supportive organisational structure, top management commitment and support, and close cooperation with technology suppliers were more important there. This might be partly due to the nature of experimentation, often linked to certain persons or smaller groups that might be more common in smaller countries, compared to the larger countries, where project costs and political risks have a different magnitude. The single least important internal innovation supporting factor was hierarchical top-down power (43.1 per cent of respondents); this was common in all responding countries. Interestingly, good market knowledge in Denmark (33.3 per cent) and internal learning capabilities in Finland (23.5 per cent) were considered the least important innovation supporters in these countries. These results support accepting proposition PM6, stating that personal leadership (i.e. existence of 'key' individuals) is the internally dominating factor supporting innovation in public sector services. Indeed, we have to keep in mind that the questionnaires were filled in by people directly linked to the surveyed innovations, which might give slightly biased responses towards the importance of personal leadership issues. These results support the basic statement of Drucker (1985: 30), who stated that "entrepreneurs innovate". The importance of such 'key' individuals in the innovation process is stressed by many authors (see for example Koch and Hauknes, 2005; Rothwell, 1992). As from a single country perspective, only the UK did not have personal leadership as the most important factor (see figure 6.5), which also shows the appropriateness of the

Troika-model of innovation promotors in the public sector (see Hauschildt and Kirchmann, 2001; sub-chapters 2.3 and 4.1). The model differentiates three different layers of these innovation leaders: the power promotor (at the top), the process promotor (in the middle) and the technical promotor at the expert or innovator level. Furthermore, our research shows that from country to country, the level of the most important promotor might differ, however, it is always one of the most important driving forces towards the innovation success.

Figure 6.5 Internal factors supporting innovation in public sector services (Question D1)



Note: scale 1 = not important; 2 = of little importance; 3 = important; 4 = very important.

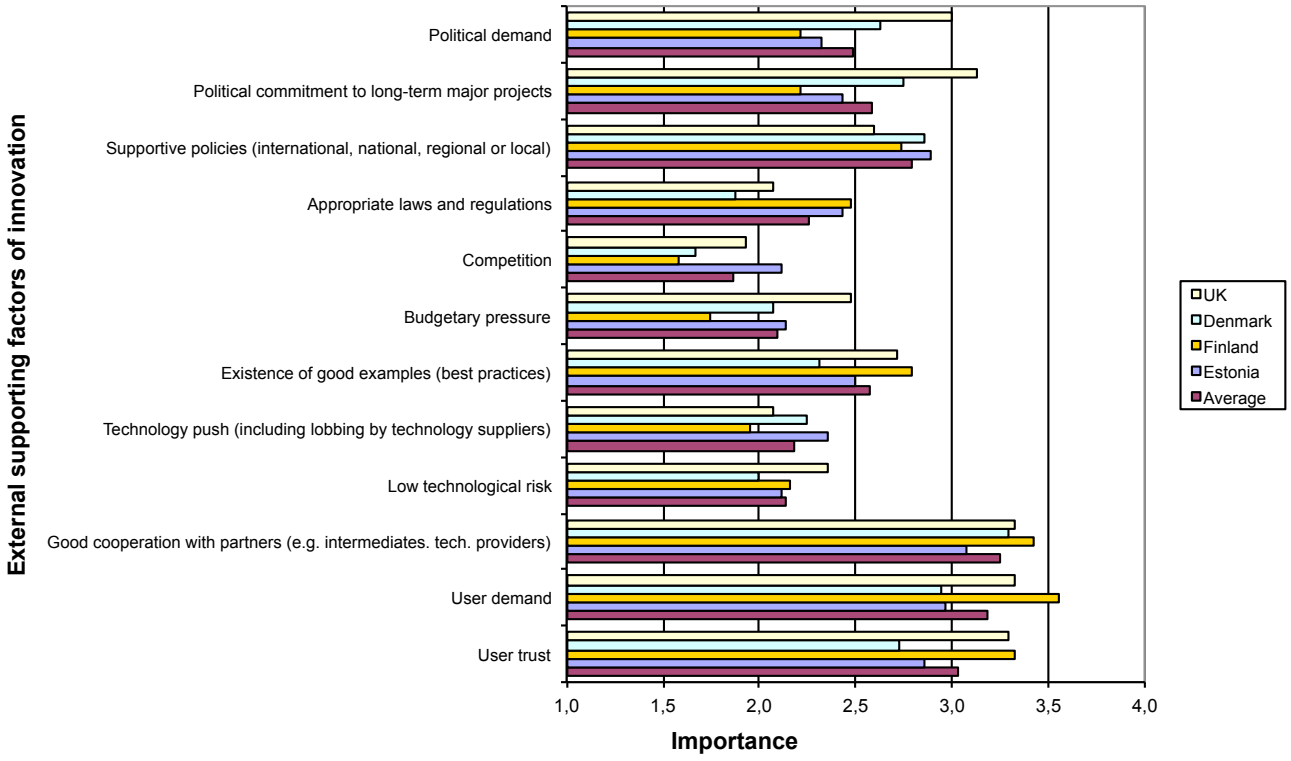
Figure 6.6 illustrates the importance of different external factors supporting innovation in public sector services. External supporting factors are generally rated relatively lower than the internal factors. The most important external factor has been good cooperation with partners (intermediates and technology providers), rated 3.25. This was followed by user demand (3.18) and user trust (3.03). Supportive policies (international, national, regional or local) were also rated as being relatively important (2.79). Conversely, the least important external factor was competition (1.86), followed by budgetary pressure

(2.09), low technological risk (2.14), technology push (2.18), and appropriate laws and regulations (2.26). From a single country perspective, the picture was more scattered than in the case of internal support factors. For example, in the UK, political demand, political commitment to long-term projects and budgetary pressure were relatively more important than in other countries. In Denmark, several factors were less important than in other countries, for example low technological risk, user trust and demand, and appropriate laws and regulations. Political demand and commitment to long-term major projects were relatively important in Denmark (as in the UK). In Finland, competition, budgetary pressure, technology push, and political demand and commitment to long-term major projects were relatively less important for innovation than in other countries. User demand and trust were rated relatively higher in Finland than in other countries (except the UK).

Similarly to the previous questions, the respondents were also asked to name the single most and the single least important external innovation supporting factor. Across countries, while the scale question found the most important factor was good cooperation with partners, in this question it changed to user demand (26.3 per cent), previously the second most important external innovation supporting factor. The importance of the factor supportive policies (11.8 per cent) has slightly improved compared to the position of user trust (currently 6.6 per cent) in the scale question. From a single country perspective, user demand is highly important in the UK (38.5 per cent) and Finland (42.1 per cent), while in Finland good cooperation with partners (35.3 per cent) outperforms other external innovation supporting factors. The least important external innovation supporting factors across countries were competition (28.9), political demand (21.1 per cent), and technology push (10.5 per cent). These results support the acceptance of proposition PM1 – factors influencing the innovation process in public sector services differ to some extent from the ones we know from the private sector. From figure 6.6 we see that competitiveness together with budgetary pressure are some of the least important external innovation supporting factors in public sector services. However, one should be careful in making simple conclusions. For example, from the external hampering factors' figure (see figure 6.8) we see that, as a direct hampering factor, finances are rated as one of the most important ones. The results confirm that classical 'technology push' (see Godin, 2005) does not work in the public service innovation process (proposition PT3). In this proposition, 'technology push' was considered more openly than traditionally – i.e. from the perspective of technology suppliers and other partners (private firms) trying to sell, push or lobby their services and existing solutions to the public sector. From that perspective, we can surely

support the proposition – technology push appeared to be the fourth least important external innovation supporting factor. The low importance of such activity might be linked to the fact that technological innovations in public sector are mostly unique, i.e. it would be impossible to use existing/standard solutions for their development. On the other hand, successful technological innovations are usually dependent on many interrelated aspects, such as resistance to change, availability of appropriate technological competences in that particular sector in a country, but also on local and global technology demand in these sectors, as was shown in terms of ICT take-up in different sectors by Tiits and Rebane (2009; see also sub-chapter 4.3).

Figure 6.6 External factors supporting innovation in public sector services (Question D2)



Note: scale 1 = not important; 2 = of little importance; 3 = important; 4 = very important.

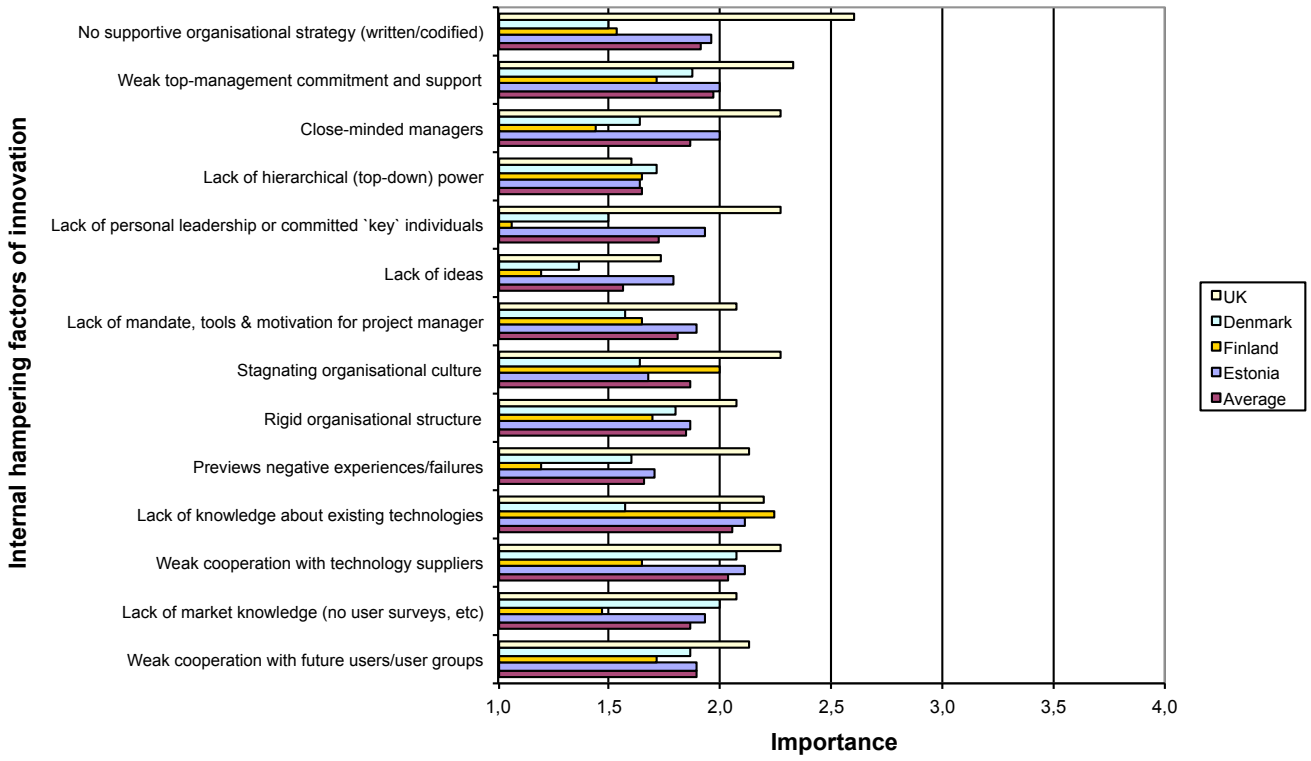
Figure 6.7 illustrates the importance of different internal factors hampering innovation in public sector services. Organisations rate the importance of different innovation hampering factors (internal and external) much lower than they did the supporting factors (for statistical significance see the last part of this sub-chapter). Country differences are also relatively larger in terms of hampering factors

(especially internal hampering factors) than for supporting factors. In terms of the importance of different internal hampering factors, we should first stress that most factors were rated below the average (2.5). Of these, the most important internal factor was lack of knowledge about existing technologies (2.05), followed by weak cooperation with technology suppliers (2.03), weak top management commitment and support (1.97) and no supportive organisational strategy (1.91). The least important internal factors were lack of ideas (1.56), lack of hierarchical (top-down) power (1.65), previous negative experiences (1.66), and lack of personal leadership (1.72). The largest country differences are between the UK and other countries. For example, no supportive organisational strategy (written/codified) was rated much higher in the UK than in other countries, the same goes for weak top management commitment and support, close-minded managers, lack of personal leadership or committed 'key' individuals, stagnating and rigid organisational culture, and previous negative experiences/failures. Conversely, Finland rated many factors relatively lower compared to other countries, i.e. these were not important innovation hampering factors for this country (e.g. in lack of personal leadership and 'key' individuals, close-minded managers, lack of ideas, previous negative experiences, and lack of market knowledge).

The respondents were also asked to name the single most and the single least important internal innovation hampering factor. First, we have to say that responses were quite equally distributed across all possible factors (i.e. no factors were much better than the average), especially if we talk about the most important factors. Still, the most important internal innovation hampering factor was weak cooperation with technology suppliers (12.3 per cent); followed by lack of market knowledge (10.8 per cent), no supportive organisational strategy (9.2 per cent), and stagnating organisational structure (9.2 per cent). From a single country perspective, in the UK the most important internal innovation obstacle was no supportive organisational strategy (25 per cent), in Denmark weak cooperation with technology suppliers (25 per cent), in Finland stagnating organisational culture (26.7 per cent), and in Estonia weak cooperation with technology suppliers as well as lack of market knowledge (both 15.4 per cent). From the perspective of the least important internal innovation obstacles, we see that no supportive organisational structure, as well as lack of ideas were mentioned most often (both 15.6 per cent); this was followed by previous negative experiences/failures (12.5 per cent). The non-existence of supportive organisational strategy was seen as the least important internal innovation obstacle more often in Estonia (26.9 per cent) and Finland (14.3 per cent) than in Denmark (9.1 per cent) and the UK

(7.7 per cent). This leads to the understanding that the existence of an appropriate written strategy is seen as more important in the UK and Denmark than in Finland and Estonia. Indeed, as said earlier, one should be careful in interpreting these results, because in general the hampering factors were rated below the scale average (2.5 in the scale question).

Figure 6.7 Internal hampering factors of innovation in public sector services (Question E1)



Note: scale 1 = not important; 2 = of little importance; 3 = important; 4 = very important.

Figure 6.8 shows the importance of different external factors hampering innovation in public sector services. The level of importance of external hampering factors is similar to internal hampering factors (for statistical significance look at the end of this sub-chapter). On the one hand, the most important external hampering factor was lack of finances (2.35), followed by high technological risk (2.04), absence of relevant good examples (2.01), high political/reputation risk (2.01), weak cooperation with partners (1.99), and digital divide (1.99). On the other hand, the least important external factors were lack of user demand (1.73), lack of trust (1.81), lack of supportive policies (1.83), no or weak political demand (1.85), and inappropriate laws and regulations (1.85). The largest country differences are for

high political/reputation risk, and lack of demand (in both cases the UK rated relatively higher and Finland relatively lower). Interestingly, Finnish organisations were relatively less influenced by most of possible innovation hampering factors (i.e. no political commitment to long-term projects, lack of supportive policies, inappropriate/rigid laws and regulations, lack of finances, high political/reputation risk, high technological risk, weak cooperation with partners, lack of user demand, lack of trust, and digital divide).

Asking to name the single most important external innovation obstacle, the respondents first stressed the lack of finances (21.1 per cent), followed by the absence of relevant good examples (15.5 per cent), and digital divide (9.9 per cent). In the UK, the most important external innovation obstacle was the lack of finances (30.9 per cent) followed by the absence of relevant good examples (23.1 per cent), while in Denmark it was absence of relevant good examples (21.4 per cent). In Finland, weak cooperation with partners (e.g. intermediates or technology providers) was seen as the most important external innovation obstacle (23.5 per cent), while in Estonia lack of finances was seen important (22.2 per cent), followed by digital divide (18.5 per cent). The least important external innovation obstacles were no or weak political demand (20.9 per cent), followed by lack of user demand (13.4) and high political/reputation risk (11.9 per cent). In the UK, inappropriate or rigid laws and regulations (33.3 per cent) were seen as the least important external innovation obstacles, while in Finland high political/reputation risk (23.5 per cent), and in Estonia no or weak political demand (26.9) followed by lack of user demand (19.2 per cent) were the least important external innovation obstacles.

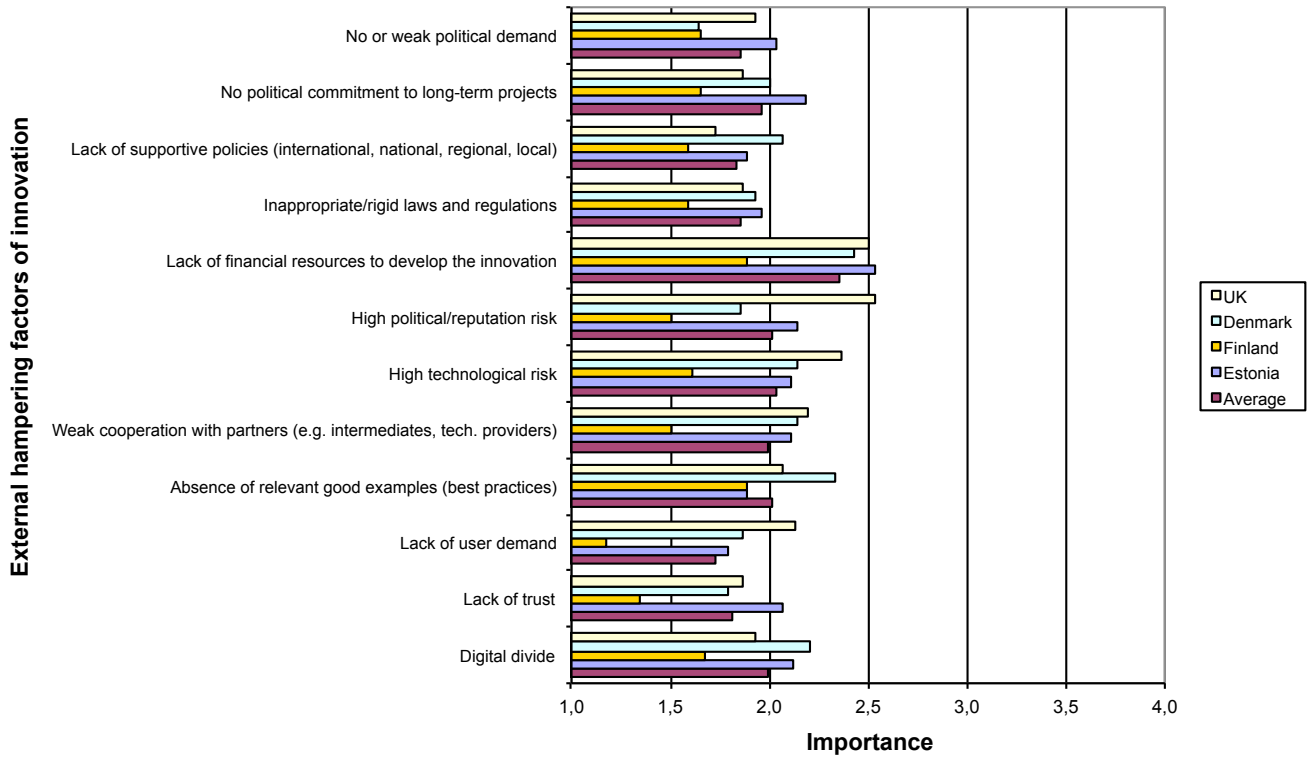
In looking at these external factors hampering innovation, one should keep in mind that almost all of them were below the 'scale average' (2.5). This means that surveyed organisations faced different (internal and external) innovation hampering factors relatively weakly while developing their innovations.

From the technology perspective, figures 6.5 to 6.8 show that different technological issues, such as good knowledge of existing technologies, close cooperation with technology providers, technological risk, existence of good examples, technology push (lobbying by technology providers) and digital divide are intertwined with managerial, political, legal, personal (personnel), and other issues. Even if Koch and Haukens (2005) believe that technological factors can be a strong determinant for subsequent innovation (chapter 3), our research here tends to support proposition PT2 that the role of technology in

today's public sector is integrated with other managerial processes; the time when technology was considered something separate and different is over. The results show that the role of technology in today's public sector is becoming integrated with other managerial processes. However, even if we accepted the proposition that technological issues are related to managerial processes, one can say that there is still a long way to go. The largest challenge is that today innovations in government are ad hoc initiatives and mostly linked to a particular organisation and/or particular services or technological solutions. Therefore, mutual and continued organisational and technological upgrading of governance and service systems, as well as fundamentally new approaches and business models of solving escalating problems and realising national opportunities are needed to successfully face today's challenges. However, we accept proposition PT2 only partly as from the external learning perspective, technology-related issues are still the central issues.

The above-mentioned research results support also accepting proposition PT4 that technological risk is the most important external hampering factor in the public service innovation process. The literature considers technological knowledge one of the more complicated types of knowledge and that innovation is related to risk-taking and uncertainty (which politicians typically avoid). Authors are tackling innovation from the risks and obstacles perspectives in public sector quite extensively (Bhatta, 2003; Kubr, 1988) – while citizens demand a modernised government, they are generally ambivalent about innovation in the public sector, particularly because innovation often involves risk-taking that can lead to significant monetary losses (see Teofilovic, 2002; sub-chapter 2.1). Our research supported this proposition that technological risk is among the most important external hampering factors in the public service innovation process. It was the second most important external hampering factor, after lack of finances, followed by the absence of relevant good examples, high political/reputation risk, weak cooperation with partners and digital divide. Moreover, as an innovation supportive factor (figure 6.6), low technological risk was the third least important external factor.

Figure 6.8 External factors hampering innovation in public sector services (Question E2)



Note: scale 1 = not important; 2 = of little importance; 3 = important; 4 = very important.

In order to understand the full picture of factors influencing successful innovations in public sector services, one should look also at the differences in importance between internal and external factors, supporting and hampering factors. For that purpose, we have performed Paired Sample T-Tests (see annex 8 for details).

Firstly, looking at innovation supporting factors, on average, the internal factors (Question D1 mean of means 2.9524) are weighted statistically significantly (0.000) more important than the external ones (Question D2 mean of means 2.5800) are. Therefore, we have to reject proposition PM4 stating that innovation supporters in the public sector can be equally internal to the organisation and external. The results support the views of Vigoda-Gadot *et al.* (2005), who found that all of the participants could be initiators of innovation in the public sector, however, internal actors like managers and frontline employees are the primary initiators of innovation. These are followed by employees, other

organisational personnel and only then by professionals, government and politicians, end-users and external organisations.

Internal supporting factors (>) External supporting factors

Secondly, from the perspective of innovation hampering factors, the situation is vice-versa than in case of supporting factors, indeed, the difference is smaller. In this case, internal (hampering) factors (Question E1 mean of means 1.8479) are weighted significantly (0.008) less important than the external ones (Question E2 mean of means 1.9578) are. The results show that contrary to the statement of Vigoda-Gadot *et al.* (2005), who specify that barriers to innovation in the public sector are predominantly internal to the organisation, we have to reject proposition PM5 that innovation barriers in the public sector are predominantly internal to the organisation. Our research showed that innovation barriers in public sector are relatively equally internal to the organisation and external. Indeed, from the statistical perspective, internal factors had a less important weight than the external ones. Our findings follow the private sector services experiences, where, according to Howells and Tether (2004), the external conditioning factors are seen as more significant barriers to firm innovation than internal barriers.

Internal hampering factors (<) External hampering factors

Thirdly, when merging internal supporting factors with internal hampering factors (responses to questions D1 and E1; mean of means 2.4337), and external supporting factors with external hampering factors (responses to questions D2 and E2; mean of means 2.3077), we see that the importance of internal factors slightly but statistically significantly (0.000) outperforms the importance of external factors.

Internal factors (supporting + hampering) **(>) External factors** (supporting + hampering)

This difference gives the confidence to say that, in general, in order to succeed in public service technological innovations, organisational factors are more important than the ones of the external environment, i.e. the existence of written strategy, open minded managers, and ‘product champions’

who are ready and motivated to carry through the project, are more important than the external influence, i.e. political demand, budgetary pressure, or appropriate laws and regulations.

Fourthly, when merging internal and external supporting factors (responses to questions D1 and D2; mean of means 2.7500), and internal and external hampering factors (responses to questions E1 and E2; mean of means 1.9248), we see that the importance of supporting factors very significantly (0.000) outperforms the importance of hampering factors.

Supporting factors (internal + external) **(>) Hampering factors** (internal + external)

This dominance of supporting factors over hampering factors might mean different things. First, it might be due to the fact that we surveyed existing, i.e. only successful, cases of technologically innovative public sector services, and in order to succeed one should face more supporting than hampering factors. Secondly, it is psychologically easier to describe one's strong features (i.e. supporting factors within the organisation) than negative ones (i.e. hampering factors within the organisation). In any case, in order to succeed, one should look optimistically towards the possibilities and try to take advantage of the existing supporting factors and develop them, (both within the organisation and externally), at the same time minimising the influence of possible hampering factors (again, within the organisation and externally).

6.6. Public policy effects on the development of technologically innovative public sector services

As was elaborated in sub-chapter 2.1, national or regional 'innovation culture' should be understood in terms of attitudes towards innovation, technology, exchange of knowledge, entrepreneurial activities, business, uncertainty (Hofstede, 2001), and related behaviour and historical trajectories. Wieland (2004) conceives culture of innovation as the institutions (norms, values, formal and informal) that have a significant influence on how the actors involved in an innovation process perceive economic and technical challenges and that provides them with strategies to tackle these. Public sector institutions are assumed to be non-innovative exactly because of their bureaucratic nature, with strict rules, rigid regulations and habitual ways of doing things. Therefore, it is expected that innovation in the public sector requires changes in laws and regulations; moreover, it requires significant contribution

from government leaders and public policy in order to happen. From the innovation policy perspective, we know that its two first generations have neglected the public sector and its services (see for example European Commission, 2002), and only the third generation is expected to emphasise the benefits of co-ordinating actions in policy areas, and make innovation – and innovation-friendly policies – one of the core principles of this. Thus, it would place innovation at the heart of each policy area.

In general, it is relatively difficult to assess the direct effects of any particular policy or law on a concrete case of public service innovation. Nevertheless, in the current survey, we undertook the following exercises (see also statistical output tables and charts in annexes 3 and 5-7):

(a) We asked the survey sample whether their innovation required any changes in laws and regulations;
(b) We asked the sample whether their innovation was motivated or influenced by any written/codified public policy;
(c) We also tackled public policy, as well as laws and regulation related issues in other questions (scale questions related to innovation goals and results, and factors influencing the innovation process).

Contrary to initial expectations, relatively few public service innovations required changes in laws and regulations (see table 6.16). Altogether, only 21 per cent of responding organisations reported that their innovation required changes in laws and regulations (5 per cent of them in local or regional, and 16 per cent in national laws and regulations). The 'legal barrier' was larger in Estonia (40 per cent of innovations required legal or regulatory changes) and smaller in the UK and Finland (where 7 per cent and 10 per cent respectively of innovations required such changes). Legal and regulatory barriers were also evaluated as being non-important in the questions on external factors supporting innovation (see figure 6.6) and external factors hampering innovation (see figure 6.8), discussed previously. Therefore, we have to reject sub-proposition PS3.1 that innovation in the public sector requires changes in laws and regulations.

Table 6.16 Changes in laws and regulations related to public service innovation (% of respondents)

Country	**Yes**, in local/regional laws and regulations	**Yes**, in national laws and regulations	**No**
UK	7	0	93
Denmark	0	17	78
Finland	0	10	90
Estonia	11	29	61
AVERAGE	5	16	78

Note: the respondents were asked whether the innovation require any changes in laws and regulations.

If the legal barriers of innovation faced by the responding organisations were relatively weak (see figures 6.6 and 6.8 and table 6.16) then the motivations and influence of public policies on service innovation development were much larger (see table 6.17). Across all four countries, only 35 per cent of organisations reported not having any influence from public policies while innovating (this was largest in Estonia, 46 per cent, and smallest in the UK, 20 per cent). The majority of organisations that felt the influence of public policy did so from national (governmental) policies (57 per cent), followed by international policies (12 per cent) and local/regional policies (7 per cent). Governmental policies were most influential in the UK (80 per cent of respondents), followed by Finland (65 per cent), Estonia (50 per cent) and Denmark (39 per cent). The importance of public policy contributions also emerges from the question on external factors supporting innovation, where it was the fourth most important (see figure 6.6). These findings support sub-proposition PS3.2, claiming that innovation in the public sector requires contribution from public policy. The situation where the public policies have a considerable effect on public service innovations supports the broad idea of the so-called third generation innovation policy (see European Commission, 2003, as well as related theoretical discussion in chapter 2). However, even if the idea of the third generation innovation policy was to put innovation at the heart of each policy area, it was more targeted at private sector oriented policies (i.e. enterprise policy, industrial policy, technology, science and innovation policy, regional policy, educational policies, agricultural policy, etc.). Our empirically led suggestion here is that innovation should also be put at the heart of any public or administrative policy or framework. Indeed, this should be done in a careful manner as the public sector is generally risk averse and cannot fail, as some business projects might and are sometimes even expected to do.

Table 6.17 Public policy influence on public service innovation (%)

Country	**Yes**, by local/regional policies	**Yes**, by national (governmental) policies	**Yes**, by international policies	**No**
UK	0	80	0	20
Denmark	17	39	17	39
Finland	10	65	10	25
Estonia	4	50	18	46
AVERAGE	7	57	12	35

Note: the respondents were asked whether the innovation was motivated or influenced by written/codified public policy.

Our research results have clarified the general understanding of the importance of laws, regulations and policies in the public sector innovation process. The general understanding has been that they 'all' are important. For example, according to Bloch (2010), many public sector innovations may simply be dictated either directly or indirectly from external sources like policy changes, regulations, etc. Among the long list of innovation drivers, the National Audit Office (2006) lists as equally importantly the importance of new government priorities, response to crisis, change in ministerial priorities, change in policy environment, changes in resource use, implementing EU policies, etc.; a similar mixture of 'origins of innovations' is also provided by Dunleavy *et al.* (2008). The findings of our survey therefore support proposition PS3 that public policy effects (in their wider sense) on technological innovation in public sector services are multi-factorial and weigh differently depending on the activity. The results show that public policy can affect public service innovations from different angles (i.e. direct policies, laws and regulations, and even political commitment to major projects as well as related leadership), however, different aspects of public policy have different influences. In general, public policy influence (in the narrow sense) is seen as a much more important driver for innovation than laws and regulations. Indeed, one should also understand that this was a best practice research by its nature, which means that non-existing cases might be so because of a disruptive legal framework. This is definitely the case for larger infrastructural innovations (such as ID cards, cross-use of different databases, etc.). Therefore, the fundamental aim is to maximise the chances that the regulatory framework will support innovation objectives, rather than running the risk of impeding or undermining them. Therefore, we also accept the whole proposition (PS3) and support the views of Thenint (2010),

that often the issues faced by public authorities are complex and according to the wrong policy mix can have adverse effects on overall government performance.

We also asked the respondents whether the usage of their innovative services requires legally valid authorisation. We see from table 6.18 that 33 per cent of them required it (maximum 46 per cent in Estonia) and 68 per cent on average and across countries did not (maximum 87 per cent in the UK). This might be partly related to the sophistication services, the availability of certain infrastructure (e.g. for personal identification), or the size of a country (for example e-elections have slightly different risks if they are conducted in a small or large country).

Table 6.18 Legally valid authorisation of the user (%)

Country	**Yes** (required)	**No** (not required)
United Kingdom	13	87
Denmark	41	59
Finland	20	80
Estonia	46	54
AVERAGE	33	68

Note: respondents were asked does the usage of the innovation require legally valid authorisation of the user.

Finally, for background information, table 6.19 illustrates the methods innovators used for the user authorisation of their innovative services. Innovators mostly used either ID card related infrastructures (more actively in Estonia and Finland) or basic sign-up identification (more actively in the UK and Denmark). Indeed, in more than one-third of cases, users were not identified at all; this was highest in Finland (55 per cent) and lowest in Denmark and Estonia (29 per cent).

Table 6.19 Methods used for the authorisation of the user (%)

Country	ID card and related infrastructure	Commercial Banks' identification systems	Basic sign-up identification (not legally valid)	Other	Users are not identified
United Kingdom	0	7	53	13	47
Denmark	6	0	24	29	29
Finland	30	15	10	20	55
Estonia	57	25	29	18	29
AVERAGE	29	14	28	20	39

Note: respondents were asked which methods do they use for the authorisation of the user.

6.7. Summary and considerations

This first analysis chapter provided new empirical evidence illustrating the innovation process in public sector services in the UK, Denmark, Finland and Estonia. The chapter started with a sample description of the survey and response rates. It then opened up the nature of public service innovations of the survey. This was followed by the core themes of the research like innovation-related organisational learning, goals and results of the innovation process, organisational and external factors influencing, both supporting and hampering the innovation process, as well as public policy effects (including the legal framework) on innovation processes. The chapter also answered – supported or rejected – many important research propositions (see also chapter 8) as well as provided an empirical basis for the next phases of the analysis (chapter 7). From the methodological side, analyses were undertaken using SPSS and descriptive statistics in this phase of the research.

While studying how governments inovate, one should indeed be aware that public sector institutions cannot be flexible like start-up companies are, however, the spiritual climate should be there to encourage innovative thinking and allow bright people and small teams to emerge and experiment with certain services or governance practices. To make this innovation process more cross-functional and cross-organisational, and to isolate it from daily administration functions, it is worth suggesting so-called task forces. Originally introduced by military, these temporary or permanent and mission oriented, often multi-disciplinary teams study a particular challenge (which often involves responsibility areas of several ministries, or even the private and non-for-profit sectors) and provide appropriate, creative and effective solutions. There are good examples where task forces have been in introduced in today's more advanced and strategically agile governments; Singapore being the most

famous example of how to make them an organic part of the governance system. Strategic agility, meanwhile, is a term coined by Doz and Kosonen (2008). Strategically agile companies not only learn to make fast turns and transform themselves without losing momentum but their CEOs and top teams also have higher ambitions: to make their companies permanently, regularly, able to take advantages of change and disruption. They want their organisations to learn to thrive on continues waves of change, not to periodically and painfully adjust to change. Strategic agility requires strategic sensitivity, collective commitments and resource fluidity – allowing CEOs and their management teams to perceive early, decide quickly, and strike with strength and speed.

7. PRINCIPAL COMPONENT FACTOR ANALYSIS AND UNIVARIATE ANALYSIS OF VARIANCE (ANOVA) OF THE SURVEY RESULTS

> *"Every philosophical problem, when it is subjected to the necessary analysis and justification, is found either to be not really philosophical at all, or else to be, in the sense in which we are using the word, logical."* Bertrand Russell

This is the second chapter presenting the results of the empirical survey of the present research. The chapter further analyses the goals and results of innovation, as well as the factors influencing the innovation process in public sector service development. The analyses are based on the results of the previous chapter, with the aim to clarify the highly fragmented picture of factors influencing the innovation in public sector services. Therefore, this chapter first performs principal component factor analysis in order to create more generalised meta-factors.

Based on the results of principal component factor analysis, the second part of the chapter then performs univariate analysis of variance (ANOVA) of country, field and innovation type specific determinants on public sector innovation performance.

The chapter is divided into the following seven sub-chapters. The first section, 7.1, performs principal component factor analysis of the goals and results of the innovation process in public sector services. This is followed by principal component factor analysis of the factors influencing the innovation process in public sector services in section 7.2. Thereafter, section 7.3 summarises the results of the principal component factor analysis for further analysis and provides an introduction to univariate analysis of variance (ANOVA) of the survey results. The following three sub-chapters then analyse respectively country-specific (7.4), field-specific (7.5) and innovation-type specific (7.6) determinants on the factors influencing the innovation process in public sector services. The chapter ends with the summary and considerations' sub-chapter 7.7.

The results of both exercises, principal component factor analysis and the univariate analysis of variance, will assist our theoretical journey towards better understanding the public service innovation system (see chapter 8 for synthesis).

7.1. Group performance of goals and results of the innovation process in public sector services

The current sub-chapter performs principal component factor analysis (PCA) among the initial list of goals and results (which due to its length can create a problem of degrees of freedom in later analyses), influencing the innovation process in the public sector. PCA is often used as a tool in exploratory data analysis for predictive models. We test whether the initial list of innovation goals and results are performing in logical/meaningful groups that can be later used for multivariate analysis of country, field and innovation-type specific determinants of the public service innovation process. Clustering of the initial also results helps to reduce the broad spectrum of survey results into fewer and meaningful activity and factor groups to be used in illustrating and comparing the performance of public service innovation systems in four countries of our survey.

Proceeding from the latter approach, we developed two new statistically independent factors representing goals and results of innovation (as they both had 12 mirroring questions). The reason for choosing two new statistically independent factors representing these two questions (innovation goals and innovation results), and not more, was the data performance as well as the logic we decided to use for grouping the initial goals and results. We found that the list of goals and results (originally 12 alternatives) can best be divided into 'basic' and 'advanced' goals/results (see table 7.1). The new factors describe 30.0 per cent of total variance in the case of innovation goals and 34.7 per cent of total variance in the case of innovation results. Every new factor would have given an additional 11 per cent or less to the description of the total variance.

For latter multivariate analysis we used the new factors developed (basic goals; advanced goals; basic results; advanced results) separately. However, for illustrational purposes, we collated (mirrored) these new statistical factors here (see table 7.1).

The first statistically new factor called 'basic' (G1 and R1 in table 7.1) refers to more basic goals and results of technological innovation in public sector services. Using the e-government stages' framework as an illustration (see figure 4.10 in chapter 4), this factor refers to the first two (or perhaps three) stages. The 'basic' factor is related to the following innovation goals: (a) to go online, (b) to improve the take-up of the service, (c) to improve transparency, (d) to use existing technological

possibilities, (e) to gain social or political popularity, and (f) to improve/change organisational behaviour. The 'basic' factor is related to the following innovation results: (a) available online service, (b) improved take-up of the service, (c) improved transparency, (d) used existing technological possibilities, (e) gained social or political popularity, and (e) satisfied users.

The second statistically new factor called 'advanced' (G2 and R2 in table 7.1) refers to more advanced goals and results of technological innovation in public sector services. Using the e-government stages' framework for illustration (see figure 4.10), this factor refers to the last two to three stages. The 'advanced' factor is related to the following innovation goals: (a) to raise service diversity (i.e. personalised services), (b) to improve the quality of the service, (c) to reduce the cost of the service, (d) to reduce the time spent on service delivery (including waiting time), (e) to improve the competitiveness of the organisation, and (f) to respond to user needs. The 'advanced' factor is also related to the following innovation results: (a) raised service diversity (i.e. more personalised service), (b) improved service quality, (c) reduced service cost, (d) reduced time spent on service delivery, (e) and improved competitiveness of the organisation, and (e) improved/changed organisational behaviour.

We have to admit that these groups look relatively heterogeneous, therefore we have to understand the fundamental meaning of the respective components. For example, reducing the cost of the service as an innovation goal is incorporated into the group of 'advanced' factors. We know from Estonia for example, that several more fundamental technological innovations in government have taken place due to limited funding, e.g. e-tax administration of the Estonian Tax and Customs Board (also in our sample), meaning that shortages in funding might lead to fundamentally service and organisation based models. At the same time, as there is no direct competition in the public sector pushing towards continued incremental cost-cutting, and new e-services are typically advanced solutions, then not incorporating the cost factor into the category of 'basic' factors can be partly justified.

Two of the innovation goals shifted their position in factor analysis while comparing factor analysis results about the innovation goals and the innovation results. These were, first, 'improve/change organisational behaviour', which was initially a 'basic' goal but as a result of factor analysis fell into the 'advanced' group results; and conversely, 'to respond to user needs', which was initially an 'advanced' goal but as a result of factor analysis fell into the 'basic' group results.

Although labelling the new factors 'basic' and 'advanced' innovation goals and results, one should be careful in interpreting the results. The relatively low cumulative description percentage is linked to the fact that we decided to divide the initial factors into only two statistically new factors – namely 'basic' and 'advanced'. This was due to the fact that these two new factors behave logically in terms of initial factors (see table 7.1), as well as allow us to run further multivariate analysis (where a too large number of factors compared to the number of respondents would raise the problem of degrees of freedom).

Table 7.1 Rotated Component Matrix of the principal component factor analysis of goals and results

GOAL	**G1** *Basic*	**G2** *Advanced*	**R1** *Basic*	**R2** *Advanced*	**RESULT**
To go online	**0.567**	0.011	**0.568**	0.154	Available online service
To improve the take-up of the service	**0.466**	0.128	**0.513**	-0.005	Improved take-up of the service
To improve transparency	**0.659**	-0.002	**0.424**	-0.033	Improved transparency
To use the existing technological possibilities	**0.272**	-0.177	**0.510**	-0.008	Used existing technological possibilities
To gain social or political popularity	**0.356**	-0.088	**0.662**	0.055	Gained social or political popularity
To improve/change organisational behaviour *	**0.629**	0.240	0.057	**0.346**	Improved/changed organisational behaviour *
To raise service diversity (i.e. personalised service)	-0.150	**0.455**	0.298	**0.374**	Raised service diversity (i.e. more personalised services)
To improve the quality of the service	0.59	**0.698**	0.178	**0.644**	Improved service quality
To reduce the cost of the service	-0.034	**0.560**	-0.224	**0.561**	Reduced service cost
To reduce the time spent on service delivery (including waiting time)	-0.115	**0.677**	-0.141	**0.768**	Reduced time spent on service delivery (including waiting time)
To improve the competitiveness of the organisation	0.195	**0.401**	0.365	**0.620**	Improved competitiveness of the organisation
To respond to user need (user group need) **	0.226	**0.402**	**0.541**	0.293	Satisfied users (user groups) *

Notes: (1) G1 Basic describes 13.268% of total variance and G2 Advanced describes 16.736% of total variance (cumulatively 30.004%) based on initial eigenvalues. (2) R1 Basic describes 21.509% of total variance and R2 Advanced describes 13.157% of total variance (cumulatively 34.666%) based on initial eigenvalues.
(*) the innovation goal, which shifted its position as a result of factor analysis (from being a 'basic' goal to an 'advanced' result).
(**) the innovation goal, which shifted its position as a result of factor analysis (from being an 'advanced' goal to a 'basic' result).

7.2. Group performance of factors influencing the innovation process in public sector services

The aim of the present sub-chapter is to understand the logic behind the performance of different factors influencing the innovation process in public sector services. We test whether the initial factors (see chapter 5) perform in logical groups of activity, i.e. that for future analysis we do not need to use a long list of factors (which may also create a problem of degrees of freedom) and that they can be clustered in a meaningful way. For that purpose, we carried out principal component factor analysis similarly to the tests that were done for innovation goals and results. Clustering the initial factors helps both our latter multivariate analysis as well as in describing and comparing the performance of public service innovation systems in four countries of our research.

Firstly, we look at the internal structure and logic of the factors influencing the innovation process in public sector services. As for the goals and results of innovation in the previous sub-chapter, we ran a factor analysis for developed new statistically independent factors representing (a) internal innovation supporting factors; (b) internal innovation hampering factors; (c) external innovation supporting factors; and (d) external innovation hampering factors.

From the organisational (internal) perspective, we developed four new statistically independent factors representing both innovation supporting and innovation hampering factors. Following the data performance, the new statistical factors appeared to be similar for both internal supporting factors (isf) and internal hampering factors (ihf). The new statistical factors cumulatively describe 56.489 per cent of total variance in the case of internal supporting factors (isf) and 77.183 per cent of total variance in the case of internal hampering factors (ihf). The new statistical factors are the following (see also table 7.2):

(a) Top management (referring to: top management commitment and support; and hierarchical top-down power) – isf1 (describes 14.242 per cent of total variance) and ihf1 (describes 5.724 per cent of total variance) in table 7.2.

(b) Structure and organisational culture [referring to: innovation accepting organisational culture; flexible organisational structure; good knowledge of existing technologies; and supportive organisational structure (written/codified)] – isf2 (describes 9.838 per cent of total variance) and ihf2 (describes 8.951 per cent of total variance) in table 7.2.

(c) Operational management (referring to: open-minded managers; personal leadership or committed 'key' individuals; available mandate, motivation and tools of the project manager; existence of ideas; and previous negative experiences/failures) – isf3 (describes 12.798 per cent of total variance) and ihf3 (describes 52.906 per cent of total variance) in table 7.2.

(d) External cooperation [referring to: close cooperation with technology suppliers; good market knowledge (existence of client surveys); close cooperation with future users/user groups; internal learning capabilities] – isf4 (describes 19.611 per cent of total variance) and ihf4 (describes 9.602 per cent of total variance) in table 7.2.

For subsequent analysis, we used the new factors developed for internal supporting and hampering factors (top management; structure and organisational culture; operational management; and external cooperation) separately. However, for the illustrational purposes, we are collating (mirroring) the new statistical factors here on table 7.2. Although we have developed new statistical factors, before using them for any analysis one should carefully study the initial factors behind each of the four new factors (see table 7.2). Moreover, it is important to understand that although the new factors are similarly named (in the case of internal supporting as well as internal hampering factors), the initial factors behind them are slightly different (for example, questions related to 'lack of ideas' and 'previous negative experiences/failures' were asked only in the hampering factors question).

As with the internal factors, we also developed statistically new factors for external factors supporting and hampering technological innovation in public sector services. There were five new statistically independent factors developed. Due to data performance, the new statistical factors appeared to be different for external supporting factors (esf) and external hampering factors (ehf). The new statistical factors cumulatively describe 74.103 per cent of total variance (based on the initial eigenvalue) in the case of external supporting factors (esf) and 81.214 per cent of total variance (based on the initial eigenvalue) in the case of external hampering factors (ehf).

For external supporting factors, the new statistical factors are the following (see also table 7.3):

(a) Policy [referring to: political demand; political commitment to long-term major projects; supportive policies (international, national, regional, local); and appropriate laws and regulations] – esf1 (describes 25.291 per cent of total variance) in table 7.3.

(b) Users (referring to: user demand; and user trust) – esf2 (describes 17.422 per cent of total variance) in table 7.3.

(c) Economy (referring to: competition; and budgetary pressure) – esf3 (describes 12.285 per cent of total variance) in table 7.3.

(d) Technology and partners [referring to: low technological risk; and good cooperation with partners (e.g. intermediates, technology providers)] – esf4 (describes 10.421 per cent of total variance) in table 7.3.

(e) Technological experiences [referring to: existence of good examples (best practices); and technology push (including lobbing by technology providers] – esf5 (describes 8.684 per cent of total variance) in table 7.3.

For external hampering factors, the new statistical factors are the following (see also table 7.3):

(a) Policy [referring to: no or weak political demand; no political commitment to long-term major projects; lack of supportive policies (international, national, regional, local); digital divide] – ehf1 (describes 49.778 per cent of total variance) in table 7.3.

(b) Risks [referring to: absence of relevant good examples (best practices); high political reputation risk; and high technological risk] – ehf2 (describes 11.850 per cent of total variance) in table 7.3.

(c) User/partner [referring to: weak cooperation with partners (e.g. technology providers); lack of user demand; and lack of user trust] – ehf3 (describes 7.598 per cent of total variance) in table 7.3.

(d) Finances (referring to: lack of financial resources to develop the innovation) – ehf4 (describes 6.377 per cent of total variance) in table 7.3.

(e) Laws and regulations (referring to: inappropriate/rigid laws and regulations) – ehf5 (describes 5.639 per cent of total variance) in table 7.3.

In later analysis, we used these new statistical factors developed for external supporting and external hampering factors separately. However, for illustrational purposes, we collated (mirrored) the new statistical factors here in table 7.3. Although we have developed new statistical factors, before using them for any analysis, one should carefully study the initial factors behind each of the five new factors (see table 7.3). For example, in the case of external supporting factors, the new factor ‘policy’ also includes laws and regulations, at the same time, in the case of external hampering factors, ‘laws and regulations’ are a separate new factor (this is due to data performance). As we now saw, it is important to understand that due to data performance, the new statistical factors for external supporting and external hampering factors are differently named. This is in contrast to the previous analysis of internal factors, where new statistical factors developed for both supporting and hampering factors were similarly named (due to appropriate data performance).

Table 7.2 Rotated Component Matrix of the principal component factor analysis of internal factors

INTERNAL SUPPORTING FACTOR	**isf1** *Top management*	**isf2** ***S****tructure, Culture*	**isf3** *Operational management*	**isf4** *External cooperation*	**ihf1** *Top management*	**ihf2** *Structure, Culture*	**ihf3** *Operational Management*	**ihf4** *External cooperation*	**INTERNAL HAMPERING FACTOR**
Top management commitment and support	**0.796**	0.113	0.154	0.036	**0.662**	0.183	0.569	0.296	Weak top management commitment and support
Hierarchical (top-down) power	**0.760**	-0.055	0.052	0.211	**0.894**	0.038	0.019	0.069	Lack of hierarchical (top-down) power
Innovation accepting organisational culture	0.190	**0.696**	0.114	-0.063	0.158	**0.869**	0.246	0.185	Stagnating organisational culture
Flexible organisational structure	-0.137	**0.789**	0.091	0.034	0.092	**0.876**	0.200	0.163	Rigid organisational structure
Good knowledge of existing technologies	-0.335	**0.443**	0.036	0.270	0.336	**0.440**	0.303	0.433	Lack of knowledge about existing technologies
Supportive organisational strategy (written/ codified) *	0.330	**0.456**	-0.143	0.240	0.505	0.236	**0.521**	0.274	No supportive organisational strategy (written/ codified) *
Open-minded managers	0.341	0.105	**0.680**	0.091	0.522	0.359	**0.585**	0.124	Close-minded managers
Personal leadership or committed 'key' individuals	-0.069	-0.092	**0.797**	0.073	0.312	0.220	**0.728**	0.256	Lack of personal leadership or committed 'key' individuals
Available mandate, motivation and tools of the project manager	0.032	0.163	**0.673**	-0.170	0.089	0.168	**0.782**	0.346	Lack of mandate, tools & motivation for project manager
-	X	X	X	X	0.083	0.238	**0.687**	0.407	Lack of ideas
-	X	X	X	X	-0.052	0.538	**0.630**	0.140	Previous negative experiences/failures
Close cooperation with technology suppliers	0.134	0.077	0.011	**0.659**	0.397	0.060	0.274	**0.763**	Weak cooperation with technology suppliers
Good market knowledge (existence of client surveys, etc)	0.227	-0.132	-0.037	**0.750**	-0.003	0.167	0.248	**0.882**	Lack of market knowledge (no user surveys, etc)
Close cooperation with future users/user groups	0.067	0.130	-0.139	**0.788**	0.120	0.259	0.282	**0.826**	Weak cooperation with future users/user groups
Internal learning capabilities	-0.305	0.168	0.259	**0.612**	X	X	X	X	-

Notes: (1) isf1 describes 14.242% of total variance; isf2 describes 9.838% of total variance; isf3 describes 12.798% of total variance; isf4 describes 19.611% of total variance (cumulatively 56.489%) based on initial eigenvalues. (2) ihf1 describes 5.724% of total variance; ihf2 describes 8.951% of total variance; ihf3 describes 52.906% of total variance; ihf4 describes 9.602% of total variance (cumulatively 77.182%) based on initial eigenvalues. (3) "*" marks the factor which shifted its position in terms of new groups of factors when comparing internal supporting factors to internal hampering factors.

Table 7.3 Rotated Component Matrix of the principal component factor analysis of external factors

EXTERNAL SUPPORTING FACTOR	**esf1** *Policy*	**esf2** *Users*	**esf3** *Economy*	**esf4** *Technology & partners*	**esf5** *Techno-logical experiences*	**ehf1** *Policy*	**ehf2** *Risks*	**ehf3** *Users & Partners*	**ehf4** *Finances*	**ehf5** *Laws & regulations*	**EXTERNAL HAMPERING FACTOR**
Political demand	**0.847**	-0.179	-0.007	0.057	-0.048	**0.720**	0.182	0.339	0.331	0.141	No or weak political demand
Political commitment to long-term major projects	**0.871**	-0.005	0.051	0.162	-0.031	**0.794**	0.101	0.189	0.401	0.084	No political commitment to long-term major projects
Supportive policies (international, national, regional, local)	**0.754**	0.345	-0.045	-0.091	0.183	**0.709**	0.045	0.152	0.099	0.454	Lack of supportive policies (international, national regional, local)
Appropriate laws and regulations	**0.657**	0.275	0.127	-0.085	-0.170	0.212	0.172	0.168	0.188	**0.896**	Inappropriate/rigid laws and regulations
Competition	-0.089	-0.034	**0.895**	-0.025	0.200	X	X	X	X	X	-
Budgetary pressure	0.220	0.257	**0.796**	0.203	-0.062	0.305	0.074	0.003	**0.822**	0.217	Lack of financial resources to develop the innovation
Existence of good examples (best practices)	-0.133	0.408	-0.054	-0.191	**0.752**	0.128	**0.894**	0.102	-0.080	0.102	Absence of relevant good examples (best practices)
Technology push (including lobbing by tech. providers)	0.034	-0.145	0.218	0.265	**0.779**	X	X	X	X	X	-
-	X	X	X	X	X	0.177	**0.648**	0.361	0.346	0.195	High political/reputation risk
Low technological risk	0.033	-0.013	0.204	**0.722**	0.242	0.227	**0.796**	0.305	0.297	0.039	High technological risk
Good cooperation with partners (e.g. intermediates, tech. providers)	0.005	0.273	-0.059	**0.781**	-0.136	0.058	0.355	**0.579**	0.571	0.003	Weak cooperation with partners (e.g. technology providers)
User demand	0.045	**0.887**	0.110	0.028	0.107	0.274	0.256	**0.813**	0.066	0.152	Lack of user demand
User trust	0.170	**0.774**	0.068	0.317	-0.019	0.444	0.199	**0.773**	0.022	0.153	Lack of trust
-	X	X	X	X	X	**0.718**	0.319	0.235	-0.015	0.039	Digital divide

Notes: (1) esf1 describes 25.291% of total variance; esf2 describes 17.422% of total variance; esf3 describes 12.285% of total variance; esf4 describes 10.421% of total variance; esf5 describes 8.684% of total variance (cumulatively 74.103%) based on initial eigenvalues. (2) ehf1 describes 49.778% of total variance; ehf2 describes 11.850% of total variance; ehf3 describes 7.598% of total variance; ehf4 describes 6.377% of total variance; ehf5 describes 5.639% of total variance (cumulatively 81.241%) based on initial eigenvalues.

7.3. Summary of principal component factor analysis and introduction to univariate analysis of variance (ANOVA) of the survey results

The previous sections used principal component factor analysis (PCA) techniques to group the initial innovation goals and results, as well as organisational and external innovation supporting and hampering factors into meaningful meta-groups (new statistical factors). The exercise can be considered successful, as it was possible to group the initial goals and results, as well as the innovation influencing factors into new statistical factors.

The new statistical factors developed in this chapter were the following:

- Goals and results of the innovation process in public sector services: 'basic' (G1, R1) and 'advanced' (G2, R2);
- Internal innovation supporting factors (isf): (1) 'top management'; (2) 'structure and organisational culture'; (3) 'operational management'; (4) 'external cooperation'.
- Internal innovation hampering factors (ihf): (1) 'top management'; (2) 'structure and organisational culture'; (3) 'operational management'; (4) 'external cooperation'.
- External innovation supporting factors (esf): (1) 'policy'; (2) 'users'; (3) 'economy'; (4) 'technology and partners'; (5) 'technological experiences'.
- External innovation hampering factors (ehf): (1) 'policy'; (2) 'risks'; (3) 'user/partner'; (4) 'finances'; (5) 'laws and regulations'.

These new factors will now be used in the univariate analysis of variance of country, field and innovation-type specific determinants of the innovation process.

It is known from the practice of private sector innovation research that there might be several factors, for example, industrial field and organisational structure, which determine the innovation intensity and success of firms. Tidd *et al.* (2001), for example, concludes from the existing knowledge base that there are no easy answers about successful innovation management and that innovation varies enormously – by scale, type, sector, etc.[34] Mohr (1969) also suggested that innovation in the public sector is the function of an interaction between the motivation to innovate, the strength of obstacles against innovation, and the availability of resources for overcoming such obstacles, which by nature differ

[34] Indeed, Tidd *et al.* (2001) stress two universal points: firstly, innovation is a process, not a single event, and needs to be managed as such, and secondly, the influences on the process can be manipulated to affect the outcome, i.e. it can be managed.

according to particular circumstances. Even while the potentials of ICT are available, the evidence suggests (see Cornford *et al.*, 2006) that for every region, the ways and the effectiveness with which regions exploit these potentials vary hugely. Koch *et al.* (2005) gave an example if one country decides to provide care for elderly through publicly owned organisations, another through private and yet another through a mix of both types, then these should all be included when saying something useful about innovation in the public sector, when a functional perspective is chosen. Indeed, most comparative work on cultures is based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states (Didero *et al.*, 2008; see also sub-chapter 2.1). These slightly controversial thoughts lead to the understanding that there should be some differences in terms of the field, type or perhaps a country to which the innovation belongs. We test these thoughts on our survey sample, using the following starting points: proposition PS2 – the nature of public service innovations depends on different determinants, proposition PS2.1 – the nature of public service innovations depends on the field they belong to, PS2.2 – the nature of public service innovations depends on the type they are, proposition PS2.3 – the nature of public service innovations depends on the country they are from, and proposition PS4 – overall, the main characteristics and driving forces of the public service innovation system do not differ across different countries. Answers to these propositions will partly facilitate our research towards identifying the specifics of public service innovation systems.

7.4. Country-specific determinants on the factors influencing the innovation process in public sector services

Country-specific determinants on public sector innovation performance can have two perspectives. Firstly, there might be similarly favourable preconditions (for example technological) in place in all countries, however, as literature suggests, the real innovation performance across countries differs greatly. On the other hand, the innovations' environment as well as public sector structures can differ from country to country, determining the conditions for public sector innovation. The present sub-chapter focuses on country-specific determinants on the development and implementation of technologically innovative public sector services. For that purpose, we have developed graphs below, as well as carried out univariate (ANOVA) analyses to test the statistical significance in differences between countries in the importance of certain factors supporting or hampering innovation (internally

and externally). In ANOVA analyses, dependent variables are the new statistical factors developed during the principal component factor analysis (see previous chapter), and the determinant (fixed factor) is 'country'. All figures in this section are given on a mean scale of 0-1 (original data was on a scale of 1-4).

(A) Grouped factors representing goals and results of innovation in public sector services: country determinant

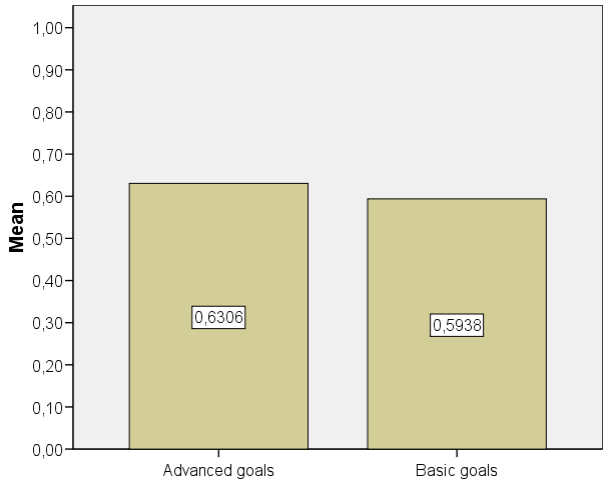
In the beginning of the empirical chapters (see chapter 6), we analysed the multidimensionality of innovation goals and results in public sector services.[35] The analyses were carried out using twelve possible, predefined goals and results of innovation. Moreover, to clarify the results, the single most and single least important innovation goals and results were studied. The initial list of innovation goals and results was then limited down to 'basic' goals and 'advanced' goals, as well as to 'basic' results and 'advanced' results. The latter was done in the previous chapter, using principal component factor analysis. The first statistically new factor called 'basic' (G1 and R1 in table 7.1) refers to more basic goals and results of technological innovation in public sector services. The second statistically new factor called 'advanced' (G2 and R2 in table 7.1) refers to more advanced goals and results of technological innovation in public sector services.

Figure 7.1 shows fundamental differences if we collate advanced goals versus basic goals (graph 1), and advanced results versus basic results (graph 2). This general collation indicates that, in general, advanced goals are a little more important than basic goals (see graph 1). Indeed, when looking at graph 2, we see that basic results are clearly more important than the advanced results. The latter is also supported also by the one sample test (see annex 10 for details), which shows statistically significant differences between advanced and basic results [Basic results (rbasic)>Advanced results (radv)], but not in advanced and basic goals.

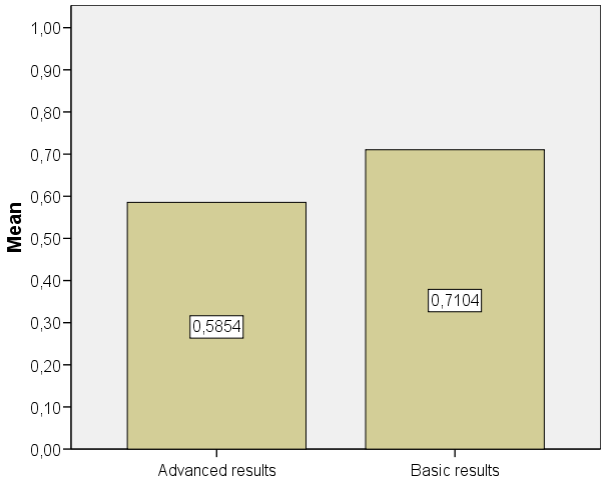
[35] The assessment was made on a four-point scale, where 1 was "not important", 2 "of little importance", 3 "important", and 4 "very important".

Figure 7.1 Advanced versus basic goals and results of innovation in public sector services

Graph 1



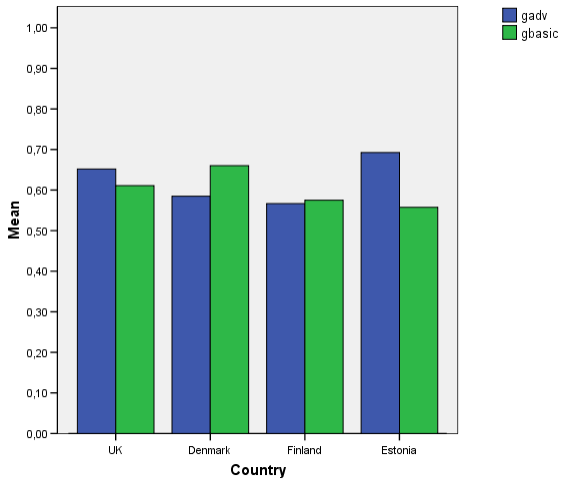
Graph 2



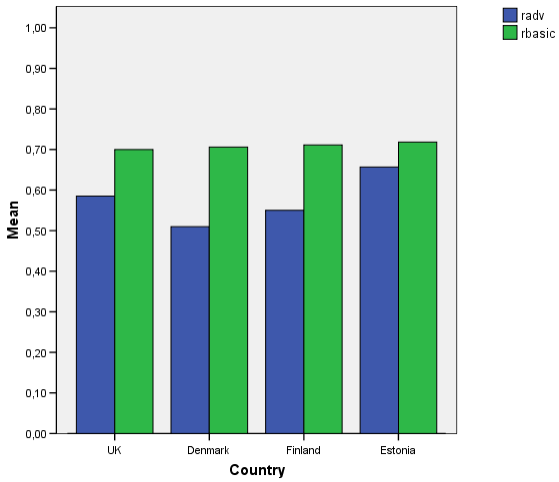
Going a step further, figure 7.2 illustrates the performance of advanced innovation goals (gadv) versus basic innovation goals (gbasic) (graph 1), as well as advanced innovation results (radv) versus basic innovation results (rbasic) (graph 2) by countries. When comparing the graphs of innovation goals and innovation results, we see that the innovation goals (graph 1) were more 'optimistic' in Estonia and the UK, where advanced goals were seen as being more important than the basic ones. Conversely, in Denmark the basic goals were seen to be more important, and in Finland advanced and basic goals had equal importance. Turning towards the innovation results (graph 2), we see that initial optimism in setting up advanced goals has decreased. In all four countries we see that the basic results were more important than the advanced ones. The difference between the advanced and basic results is smallest in Estonia and largest in Denmark. The ANOVA analysis supports the conclusion by showing statistical differences between Estonia and Denmark (Est>Dk) and Estonia and Finland (Est>Fin) in the case of advanced innovation goals, and between Estonia and Denmark (Est>Dk) in the case of advanced innovation results. There were no statistical differences between countries in terms of basic innovation goals and basic innovation results (see annex 12 for details).

Figure 7.2 Advanced and basic goals and results of innovation in public sector services: country determinant

Graph 1



Graph 2



Note: gadv = advanced innovation goals; gbasic = basic innovation goals; radv = advanced innovation results; rbasic = basic innovation results.

(B) Grouped supporting and hampering factors of innovation in public sector services: country determinant

In parallel to analysing the multidimensionality of innovation goals and results in chapter 5, we also analysed the importance of different factors supporting and hampering innovation in public sector services (internal to the organisation and externally). These analyses were carried out using a list of possible, predefined factors influencing the innovation process. Additionally, to clarify the results, the single most and single least important factors were identified. The initial list of supporting and hampering factors was then reduced to four statistically new factors (in the case of internal supporting and hampering factors) and to five statistically new factors (in the case of external supporting and hampering factors). The latter exercise was done using principal component factor analysis in chapter 6.

(B1) Internal factors

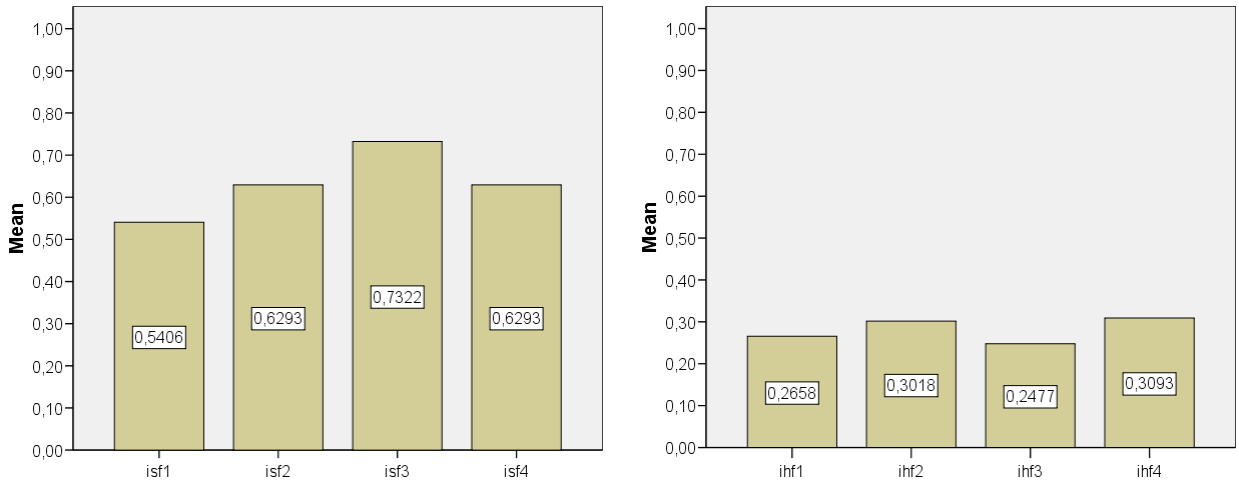
Due to data performance during the principal component factor analysis, the new statistical factors developed for internal supporting and internal hampering factors of the innovation process in public sector services were similar (both for internal supporting and internal hampering factors). The factors were the following: (a) top management (isf1/ihf1), (b) structure and organisational culture (isf2/ihf2), (c) operational management (isf3/ihf3), and (d) external cooperation (isf4/ihf4).

Figure 7.3 shows fundamental differences if we collate the four new statistical factors. As we concluded already in descriptive statistics chapter, innovation supporting factors (graph 1) were generally seen to be statistically significantly more important than innovation hampering factors (graph 2). The same is true here. From graph 1 in figure 7.3 we see that operational management (isf3) was generally seen as the most important internal supporting factor, while top management (isf1) was the least important internal supporting factor; structure and organisational culture (isf2) and external cooperation (isf4) were between these two. The relative differences between factors within the internal hampering factor question were smaller, with structure and organisational culture (isf2), as well as external cooperation (isf4) slightly more important than top management (isf1) and operational management (isf3).

For statistical differences between the factors above, we performed one sample tests (see annex 10 for details). Within the internal supporting factors question, all factors except isf2 and isf4 differed statistically significantly from each other. Conversely, within the internal hampering factors question, the only factors which differed statistically significantly were ihf2>ihf3, and ihf4> ihf3 (see figure 7.3 and annex 10 for details).

Figure 7.3 Grouped internal factors supporting and hampering innovation in public sector services

Graph 1 Graph 2



Notes: (1) isf = internal supporting factors; ihf = internal hampering factors. (2) isf1 and ihf1 = top management; isf2 and ihf2 = structure and organisational culture; isf3 and ihf3 = operational management; isf4 and ihf4 = external cooperation.

Figure 7.4 illustrates the performance of grouped factors supporting (isf, graph 1) and hampering (ihf, graph 2) innovation internally in public sector services by countries. Besides concluding that internal supporting factors are valued as more important in all countries than the hampering factors, graphs (7.4) show also other interesting issues. In graph 1 we first see that in three countries out of four operational management (isf3) was seen as the most important internal innovation supporting factor – only in the UK was it external cooperation (isf4). In all countries, the least important factor supporting innovation internally was top management (isf1). The latter might be because the new statistical (grouped) factor top management includes initial factors of 'top management commitment and support' (rated as the second most important) and 'hierarchical (top-down) power' (rated as the least important) (see table 7.2 and figure 6.5).[36]

Graph 2 in figure 7.4 shows the importance of internal hampering factors (ihf). We see that there are larger country differences here than there were in case of innovation supporting factors. Public sector organisations in the UK are seeing relatively more hampering factors while innovating than

[36] It is therefore important to look at the consistency of each new statistical factor before making any conclusions.

organisations in other countries, especially in Finland. This might be due to the size differences between the UK and other countries, which pushes up the project sizes and cost, and therefore the risks linked to them. Weaknesses in operational management (ihf3) are seen as a relatively weak innovation hampering factor (especially in Finland and Denmark). External cooperation (ihf4) conversely is seen as a relatively more important innovation hampering factor in Denmark and Estonia (not comparing the UK, where all hampering factors were assessed as being more important than in other countries). In general, the pattern of internal innovation hampering factors across countries is relatively different.

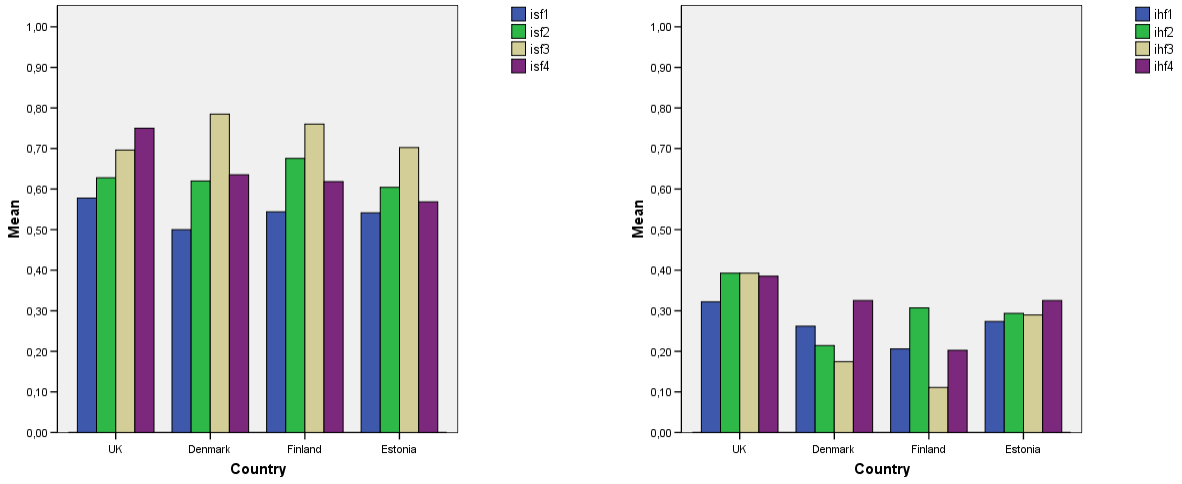
Within the internal innovation supporting factors question, the ANOVA analysis shows the only statistically significant difference in external cooperation (isf4), between the UK, were it was the most important factor, and Estonia, were it was the second lowest factor (Uk>Est). We also saw similar tendencies in chapter 5, where from the perspective of single internal innovation supporters, the UK slightly exceeded other countries in terms of management commitment and support, cooperation with technology suppliers, cooperation with future users, and good market knowledge [all but management commitment and support were components of the component factor 'external cooperation' (isf/ihf4)]. Firstly, it shows that, from the methodological perspective, the principal component factor analysis has generated accurate meta-factors corresponding adequately to the original factors. The reason why external cooperation is considered a little more important in the UK might be related to the size of the country, where by nature there are more players surrounding and/or integrated into any particular public sector service or its innovation.

In the internal innovation hampering factors question, the ANOVA analysis shows statistically significant differences in operational management (ihf3), between the UK and Denmark (Uk>Dk), the UK and Finland (Uk>Fin), and Estonia and Finland (Est>Fin) (figure 7.4 and annex 12 for details). Similarly to internal supporting factors, in chapter 5 the largest country differences in original internal innovation barriers were between the UK and other countries. For example, no supportive organisational strategy (written/codified) was rated much higher in the UK than in other countries, the same goes for weak top management commitment and support, close-minded managers, lack of personal leadership or committed 'key' individuals, stagnating and rigid organisational culture, and previous negative experiences/failures. Two of them (close-minded managers, lack of personal leadership or committed 'key' individuals) were also parts of the grouped statistical factor 'operational

management' (isf/ihf3). It should be due to the country and institutional size why in general in the UK internal hampering factors have received higher importance compared to other countries. This might be one of the reasons to believe that shortages in operational management have hindered innovation development in the UK public sector services. An alternative reason might be larger personnel turnover and individual anonymity in larger organisational setups; however, we are unable prove this as it was not the core focus of the present research.

Figure 7.4 Grouped internal factors supporting and hampering innovation in public sector services: country determinant

Graph 1 Graph 2



Notes: (1) isf = internal supporting factors; ihf = internal hampering factors. (2) isf1 and ihf1 = top management; isf2 and ihf2 = structure and organisational culture; isf3 and ihf3 = operational management; isf4 and ihf4 = external cooperation.

(B2) External factors

While the new statistical factors developed for internal factors were similar for supporting and hampering factors, due to data performance in principal component factor analysis, the new statistical factors developed for external supporting and hampering factors were different (see table 7.3). In the case of external supporting factors, the new statistical factors after the grouping exercise were the following: (a) Policy (esf1), (b) Users (esf2), (c) Economy (esf3), (d) Technology and partners (esf4), and (f) Technological experiences (esf5). In the case of external hampering factors, the new statistical

factors after the grouping exercise were the following: (a) Policy (ehf1), (b) Risks (ehf2), (c) Users and partners (ehf3), (d) Finances (ehf4), and (f) Laws and regulations (ehf5).

Figure 7.5 shows fundamental differences between countries if we collate the five new statistical factors externally supporting (graph 1), and other five externally hampering (graph 2) innovation in public sector services. To a lesser extent than in case of internal factors, but still, the external supporting factors are generally assessed as more important than the external hampering ones. From the supporting factors side (graph 1), generally users (esf2) were assessed as the most important factor, followed by technology and partners (esf4). From the other side, economy (isf3) was the least important factor. The latter might be because the new statistical factor 'economy' includes quite debatable initial factors – competition (the least important factor in the descriptive analysis) and budgetary pressure (assessed as middling in the descriptive analysis) (see figure 6.6 and table 7.3).[37]

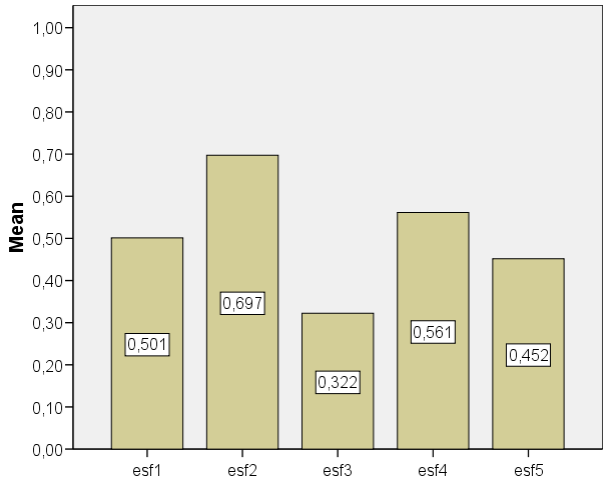
From the external hampering factors side (graph 2), in general finances (ehf4) were seen as the most influencing; this was followed by risks (ihf2). The importance of the other three external hampering factors – policy (ehf1), users and partners (ehf3) and laws and regulations (ehf5) – was lower but equal.

For statistical differences between these factors, we performed one sample tests (see annex 10 for details). Within the external supporting factors question, all factors except esf1 and isf5 differed statistically significantly from each other. Within the external hampering factors question, less factors differed (as seen also from the second graph on figure 7.5) – ehf4>ehf1, ehf4>ehf2, ehf4>ehf3, and ehf4>ehf5, i.e. finances (ehf4) was a statistically significantly more important external innovation hampering factor than the other four (see figure 7.5 and annex 10 for details).

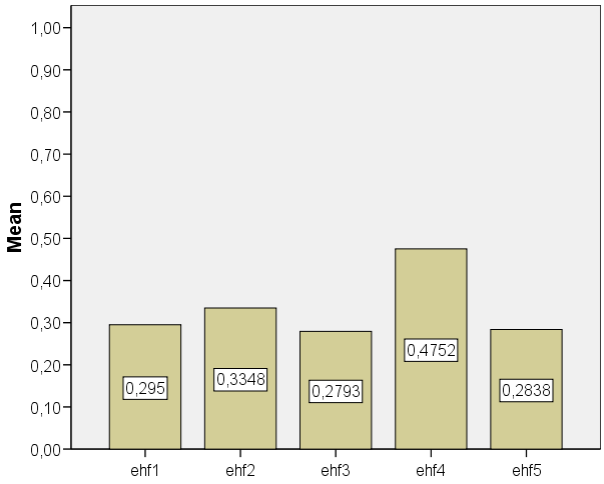
[37] It is therefore important to look at the consistency of each new statistical factor before making any conclusions.

Figure 7.5 Grouped external factors supporting and hampering innovation in public sector services

Graph 1



Graph 2



Notes: (1) esf = external supporting factors; esf1 = policy; esf2 = users; esf3 = economy; esf4 = technology and partners; esf5 = technological experiences. (2) ehf = external hampering factors; ehf1 = policy; ehf2 = risks; ehf3 = users and partners; ehf4 = finances; ehf5 = laws and regulations.

In further analysis, figure 7.6 illustrates the performance of grouped factors supporting (esf, graph 1) and hampering (ehf, graph 2) innovation externally in public sector services by countries. As said before, external supporting factors are valued as being slightly more important in all countries than the hampering factors.

From the external supporting factors side (graph 1), we see that in all four countries users (esf2) were the most important factor supporting innovation externally. In absolute terms, users tended to be most helpful in Finland and the UK. Generally, the pattern of importance in this question looks quite similar in all four countries. In their importance, users (esf2) were followed by technology and partners (esf4) and policy (esf1). The high position of technology and partners stresses the importance of low technological risk, as well as the existence of, and cooperation with, technology providers and other partners (the original factors). In third position in the importance list was policy (esf1), indicating that appropriate public policies definitely have their role in successful public service innovations. The least important external innovation supporting factor was economy (esf3). The low position of economy as a supporting factor could be linked to the fact that one of the original factors behind this new factor was

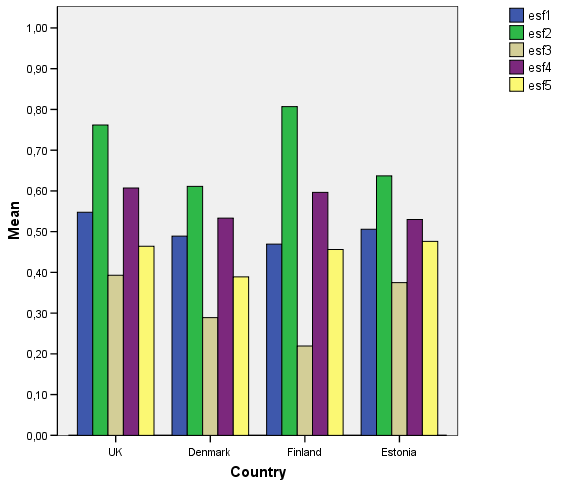
competition – usually not that important in the public sector as we know from the literature (the other original factor was budgetary pressure). Existing technological experiences (esf5) was only the fourth important external innovation supporting factor. This indicates that the existence of good examples (best practices) and strong technological push (initial factors) are not an important presumption to successful innovation process in the public sector. This gives a strong argument to say that public sector services, as well as service innovations, are too unique to gain direct input from existing technological solutions or services. However, this might not be true in terms of indirect influence of the existence of strong technology providers/partners, as well the positive managerial influence that can result if similar improvements have been successful in other organisations, within the country or abroad.

Graph 2 shows that in all four countries, finances (ehf4) is the most important external innovation hampering factor. However, in absolute terms, lack of finances (ehf4) was the most important external restriction in the UK, followed by Estonia and Denmark. This might be due the size difference between countries, i.e. the UK is much larger compared to other three countries, and therefore projects are more costly, more risky, and the 'public market' for improvement projects might be more competitive. Interestingly, Finland faced all five external hampering factors less than other three countries. Finland behaves especially well in cooperation with users and partners (ehf3) – this hampering factor is almost non-existent in this country. In three countries out of four (except Finland), different risks (ehf2) are the second most important external innovation hampering factor. As risks are usually linked to the provision of financial resources, and they are two most important hampering factors faced, we can say that financial pressure can result quite directly from the potential risks linked to a project.

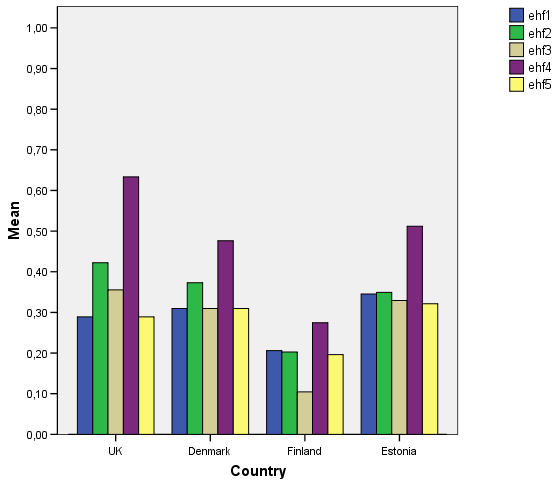
Within the external innovation supporting factors question, the ANOVA analysis shows the only statistically significant difference in users factor (esf2); in Finland it was significantly more important than in Denmark (Fin>Dk) even though it was the most important factor for both countries. Within the external innovation hampering factors question, the ANOVA analysis showed statistically significant differences in users and partners factor (ehf3), which was significantly less important in Finland than in the other three countries (Uk>Fin, Est>Fin, Dk>Fin) (figure 7.6 and annex 12 for details).

Figure 7.6 Grouped external factors supporting and hampering innovation in public sector services: country determinant

Graph 1



Graph 2



Notes: (1) esf = external supporting factors; esf1 = policy; esf2 = users; esf3 = economy; esf4 = technology and partners; esf5 = technological experiences. (2) ehf = external hampering factors; ehf1 = policy; ehf2 = risks; ehf3 = users and partners; ehf4 = finances; ehf5 = laws and regulations.

7.5. Field-specific determinants on the factors influencing the innovation process in public sector services

We saw from the literature review in chapter 2 that there are no universal categorisations of type or field of innovation in the public sector (for alternatives see Willcocks and Harrow, 1992; Okut-Uma, 2001; Baker, 2002; Howells and Tether, 2004; IDeA, 2009; Windrum, 2008). We have combined these understandings and the structure of field categories used for this survey can be seen in table 6.2. Literature has also mixed views about whether the area or field of activity determines the fundamental ability to innovate. Therefore, the present sub-chapter focuses on the field determinant on public sector technological innovation, and sub-proposition PS2.1 drawn from the literature states that the nature of public service innovations depends on the field they belong to. For that purpose, we have developed the graphs below, as well as carried out univariate (ANOVA) analyses to test the statistical significance in differences between fields of public service in the importance of certain factors supporting or hampering innovation (internally and externally). In the ANOVA analyses, dependent variables are the

new statistical factors developed during the principal component factor analysis (see previous section), and the determinant (fixed factor) is 'field'. The fields (of public services) in the current context are the following: (1) social services, (2) education services, (3) other knowledge services, (4) logistical and environmental services, (5) business services, (6) personal ID services, (7) general administration portals, and (8) eDemocracy services (question A1 in the questionnaire, see annex 1). All figures in this section are given on a mean scale of 0-1 (the original questionnaire data was on a scale of 1-4).

(A) Grouped factors representing goals and results of innovation in public sector services: public service field determinant

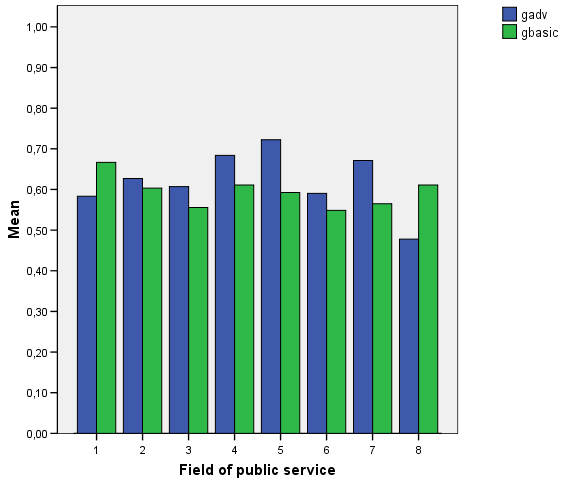
Figure 7.7 illustrates the performance of advanced innovation goals (gadv) versus basic innovation goals (gbasic) (graph 1), as well as advanced innovation results (radv) versus basic innovation results (rbasic) (graph 2) by eight different fields (described above). In general, advanced goals are a little more important than basic goals. Indeed, then looking at the innovation results, the basic results are clearly more important than the advanced results (for details and statistical significance elaboration see figure 7.1 and the respective section above).

While looking at innovation goals (graph 1 in figure 7.7), we see that in all fields except social services (1) and eDemocracy services (8), advanced goals seem to be more important than the basic goals. Three fields where advanced innovation goals were the most important (compared to basic goals) were business services (5), general administration portals (7), and logistical and environmental services (4). Indeed, when looking at the field differences in terms of innovation results (graph 2), we see that in all eight fields the basic result appears to be more important than the advanced one. The largest difference between the basic and advanced innovation results is in eDemocracy services (8) (rbasic>radv), the smallest in general administration portals (7) (rbasic>radv). In absolute terms, in terms of innovation goals (graph 1), advanced goals were the most important in business services (5), logistical and environmental services (4), and general administration portals (7). The least important advanced goals were in eDemocracy services (8), social services (1), and personal ID services (6). Basic goals were the most important in social services (1), followed by eDemocracy services (8), and logistical services (4). The least important goals were in other educational services (3) and personal ID services (6). In the case of innovation results (graph 2), in absolute terms advanced results were the most important in business services (5), and logistical and environmental services (4), and the least important in personal

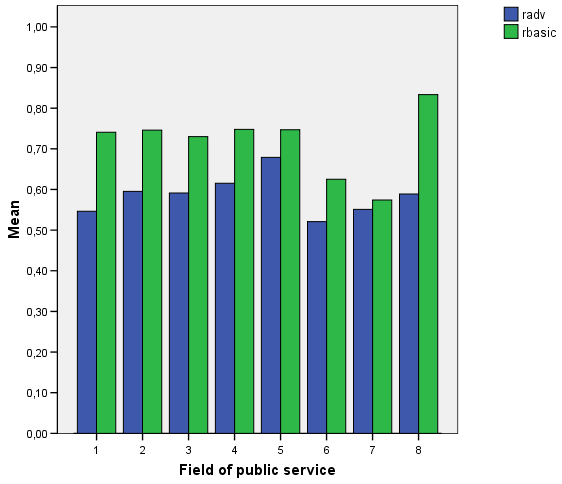
ID services (6), general administration portals (7), and social services (1). Basic results were the most important in eDemocracy services (8), and the least important in general administration portals (7), and personal ID services (6). The use of ANOVA analysis showed the only statistically significant difference in basic innovation results, between eDemocracy services (8) and general administration portals (7) [(8)>(7)] (see annex 13 for details).

Figure 7.7 Advanced and basic goals and results of innovation in public sector services: public service field determinant

Graph 1



Graph 2



Note: (1) gadv = advanced innovation goals; gbasic = basic innovation goals; radv = advanced innovation results; rbasic = basic innovation results. (2) 1 = social services; 2 = education services; 3 = other knowledge services; 4 = logistical and environmental services; 5 = business services; 6 = personal ID services; 7 = general administration portals; 8 = eDemocracy services.

(B) Grouped supporting and hampering factors of innovation in public sector services: public service field determinant

In previous sections of the empirical analysis (chapter 5), we analysed the importance of different factors supporting and hampering innovation in public sector services (internal to the organisation and externally). These analyses were carried out using a list of possible, predefined factors influencing the innovation process. In addition, to clarify the results the single most and single least important factors were identified. The initial list of supporting and hampering factors was then limited down to four

statistically new factors (in case of internal supporting and hampering factors) and to five statistically new factors (in case of external supporting and hampering factors). The latter exercise was done in the previous chapter, using principal component factor analysis.

(B1) Internal factors

Due to data performance during the principal component factor analysis, the new statistical factors developed for internal supporting and internal hampering factors of the innovation process in public sector services were similar (both for internal supporting and internal hampering factors). The factors were the following: (a) Top management (isf1/ihf1); (b) Structure and organisational culture (isf2/ihf2); (c) Operational management (isf3/ihf3); and (d) External cooperation (isf4/ihf4).

As was concluded already in descriptive statistics chapter, innovation supporting factors were generally statistically significantly more important than innovation hampering factors. The same is true here. Figure 7.8 illustrates the performance of grouped factors supporting (isf, graph 1) and hampering (ihf, graph 2) innovation internally in public sector services by fields of public service. As we see from the figure, internal supporting factors are performing more homogeneously by different fields of public service than the external ones.

From the single innovation supporting factor perspective (graph 1), in seven out of eight fields, operational management (isf3) is the most influential factor. It is the second most important only in personal ID services (6), where the most important is appropriate organisational structure and culture (isf3). In absolute terms, operational management (isf3) has the strongest influence on business services (5), eDemocracy services (8), and education services (2). In five fields out of eight [education services (2); other knowledge services (3); logistical and environmental services (4); business services (5); and eDemocracy services (8)], the pattern of importance of factors is the following: operational management (isf3) the most important; external cooperation (isf4) the second most important; structure and organisational culture (isf2) the third most important; and top management (isf1) the least important.

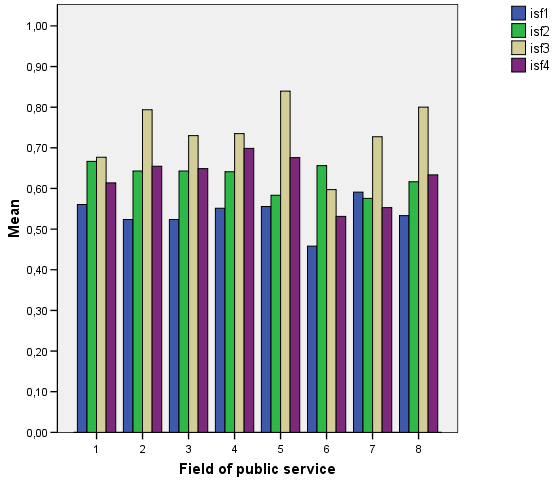
Looking at the innovation hampering factors (ihf, graph 2), which generally score lower than internal supporting factors (isf), we see that in social services (1), education services (2), and logistical and

environmental services (4) external cooperation (ihf4) is the most important hampering factor. At the same time, other knowledge services (3), personal ID services (6), general administration portals (7), and eDemocracy cervices (8) faced the strongest resistance from organisational structure and culture (ihf2). Top management resistance (ihf1) was the strongest internal hampering factor only in business services (5). The latter might be due to the relatively higher importance of different risks faced in business service development (see the external hampering factor section and related figure 7.9). Except in personal ID services (6), operational management (ihf3) was generally seen only as the third or fourth important internal hampering factor in most of the fields of public service (see figure 7.8 for details).

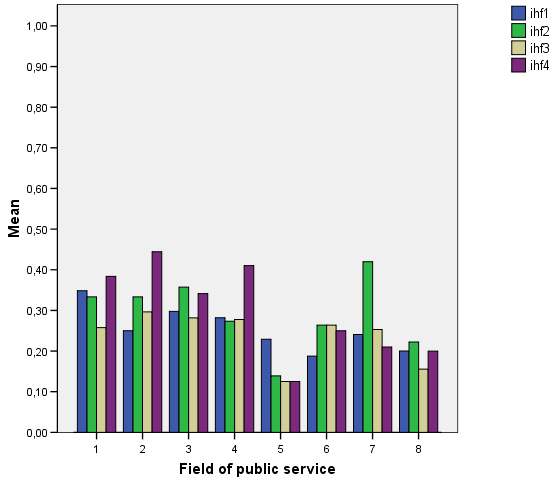
To identify any possible statistically significant differences between fields in the importance of certain factors supporting and hampering innovation internally, we performed ANOVA analysis. However, the univariate analysis did not show any statistically significant differences between different fields of public services (see annex 13 for details).

Figure 7.8 Internal factors supporting and hampering innovation in public sector services: public service field determinant

Graph 1



Graph 2



Notes: (1) isf = internal supporting factors; ihf = internal hampering factors. (2) isf1 and ihf1 = top management; isf2 and ihf2 = structure and organisational culture; isf3 and ihf3 = operational management; isf4 and ihf4 = external cooperation. (3) 1 = social services; 2 = education services; 3 = other knowledge services; 4 = logistical

and environmental services; 5 = business services; 6 = personal ID services; 7 = general administration portals; 8 = eDemocracy services.

(B2) External factors

While the new statistical factors developed for internal factors were similar for supporting and hampering factors, due to data performance in principal component factor analysis, the new statistical factors developed for external supporting versus hampering factors were different (see table 7.3). In the case of external supporting factors (esf), the new statistical factors after the grouping exercise were the following: (a) Policy (esf1); (b) Users (esf2); (c) Economy (esf3); (d) Technology and partners (esf4); and (f) Technological experiences (esf5). In the case of external hampering factors (ehf), the new statistical factors after the grouping exercise were the following: (a) Policy (ehf1); (b) Risks (ehf2); (c) Users and partners (ehf3); (d) Finances (ehf4); and (f) Laws and regulations (ehf5).

Figure 7.9 shows fundamental differences between fields of public services if we collate the five new statistical factors externally supporting (esf, graph 1), and the other five externally hampering (ehf, graph 2) innovation in public sector services. To a lesser extent than in the case of internal factors, however, the external supporting factors are also assessed as being more important than the external hampering ones. From the supporting factors side (graph 1), users (esf2) were assessed as the most important external factor in all eight fields of public service. At the same time, interestingly, economy (isf3) was the least important innovation supporting factor in seven out of eight fields. The latter might be because the new statistical factor 'economy', developed as a result of component factor analysis, includes somewhat conflicting initial factors – competition (the least important factor in the descriptive analysis) and budgetary pressure (assessed as middling in the descriptive analysis) (see figure 6.6 and table 7.3).[38] Generally, five external supporting factors score relatively similarly across all eight fields of public services. In relative terms, the new external supporting factor technology and partners (esf4) was more important in education services (2), logistical and environmental services (4), business services (5), eDemocracy services (8), and social services (1); and the least important in personal ID services (6), and general administration portals (7).

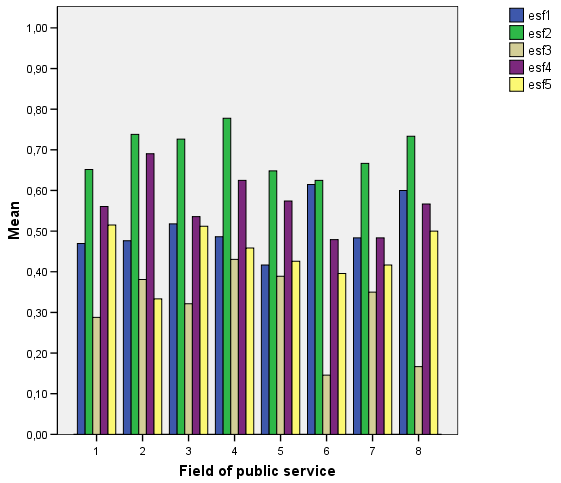
[38] It is therefore important to look at the consistency of each new statistical factor before making any conclusions.

In five fields out of eight, understandably, lack of finances (ehf4) was seen as the most important external restriction to innovation (see graph 2). However, it is interesting to see that different risks (ehf2) were also seen as important factors hampering innovation. Risks were the most important external hampering factor in business services (5), personal ID services (6), and eDemocracy services (8). Moreover, even if not the most important factor, risks were also the top external hampering factors in other fields of public service. Similar to internal hampering factors before, we also see here that business services (5) have faced generally less external restrictions than the other seven fields of public service. This can be explained by the fact that business service belongs to the group of a few public services which are directly (i.e. taxation) or indirectly (i.e. statistics) generating public income. Moreover, innovating in these fields can result in better quality public services, therefore generating more income for the state/regional/local budget. Business services (5) were also the only field of public service where two important restrictions to innovation – policies (ehf1), and inappropriate laws and regulations (ehf5) were almost non-existent. Interestingly, in six out of eight fields of public services [except business services (5) and eDemocracy services (8)], cooperation with users and partners (ehf3) was seen to be the least or second least important hampering factor. This indicates two possible scenarios – whether public institutions are too selfish or closed in their innovation process, or they have learned how to manage appropriately their partner and user/client relationships (especially in the early phases of the innovation process, where it is very crucial).

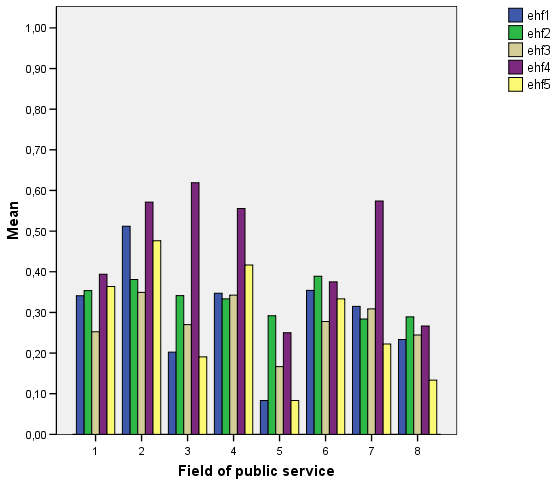
While identifying any possible statistically significant differences between fields in the importance of certain factors supporting and hampering innovation externally, we performed ANOVA analysis. The univariate analysis showed statistical differences in the external hampering factor – policy (ehf1), which was significantly more important in education services (2) compared to business services (5) [(2)>(5)]. The differences in the importance of other factors between different fields of public service were not statistically significant (see annex 13 for details).

Figure 7.9 External factors supporting and hampering innovation in public sector services: public service field determinant

Graph 1



Graph 2



Notes: (1) esf = external supporting factors; esf1 = policy; esf2 = users; esf3 = economy; esf4 = technology and partners; esf5 = technological experiences. (2) ehf = external hampering factors; ehf1 = policy; ehf2 = risks; ehf3 = users and partners; ehf4 = finances; ehf5 = laws and regulations. (3) 1 = social services; 2 = education services; 3 = other knowledge services; 4 = logistical and environmental services; 5 = business services; 6 = personal ID services; 7 = general administration portals; 8 = eDemocracy services.

7.6. Innovation-type-specific determinants on the factors influencing the innovation process in public sector services

The present sub-chapter focuses on innovation type-specific determinants. There are different typologies of classifying technological solutions in public services, as elaborated in chapter 3. Within technological services, the normative literature agrees that there are different stages in e-government provision and governments go through a number of stages before reaching maturity (Irani, 2006; see also sub-chapter 4.3). Due to the sample size of the present research, and to allow adequate comparison of the core results, we adopted a basic threefold structure of (1) 'front office', (2) 'back office functions', and (3) 'both front and back office'.

To analyse innovation type as a determinant for public sector innovation, we developed the graphs below, as well as carried out univariate (ANOVA) analyses to test the statistical significance in

differences between different types of innovations in the importance of certain factors supporting or hampering innovation (internally and externally). In ANOVA analyses, the dependent variables are the new statistical factors developed during the principal component factor analysis (see previous chapter), and the determinant (fixed factor) is 'innovation type' – front office, back-office, or both front and back office. The innovation type determinant was developed as a way of asking respondents to mark which part of the service the innovation mainly influenced (question A2 in the questionnaire, see annex 1). All figures in this section are given on a mean scale of 0-1 (the original questionnaire data was on a scale of 1-4).

(A) Grouped factors representing goals and results of innovation in public sector services: innovation type determinant

In the beginning of the empirical chapters (chapter 6) we analysed the multidimensionality of innovation goals and results in public sector services.[39] The analyses were carried out using twelve possible, predefined goals and results of innovation. Moreover, to clarify the results, the single most and single least important innovation goals and results were studied. The initial list of innovation goals and results was then limited down to 'basic' goals and 'advanced' goals, as well as to 'basic' results and 'advanced' results. The latter was done in the previous chapter, using principal component factor analysis. The first statistically new factor called basic' (G1 and R1 in table 7.1) refers to more basic goals and results of technological innovation in public sector services. The second statistically new factor called 'advanced' (G2 and R2 in table 7.1) refers to more advanced goals and results of technological innovation in public sector services.

Figure 7.10 illustrates the performance of advanced innovation goals (gadv) versus basic innovation goals (gbasic) (graph 1), as well as advanced innovation results (radv) versus basic innovation results (rbasic) (graph 2) by three types of innovation, whether the innovation influenced front office (1), back office (2), or both (3); see the description above. When looking at innovation goals (Graph 1), we see that advanced (gadv) and basic goals (gbasic) were relatively equally represented in innovations, which influenced only the front office (1) or both front and back office (3). However, in the case of the back

[39] The assessment was made on a four-point scale, where 1 was "not important", 2 "of little importance", 3 "important", and 4 "very important".

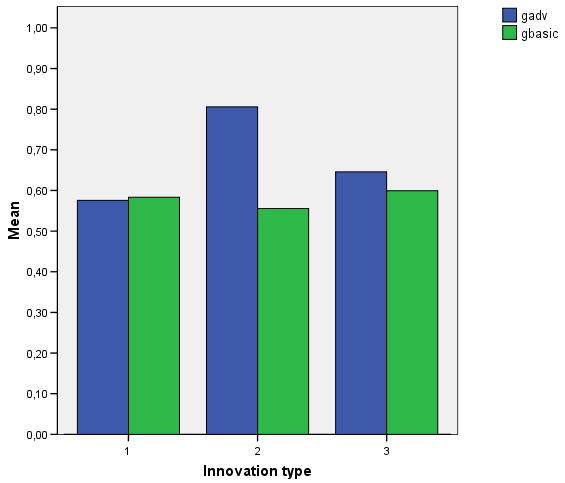
office (2), we see that advanced goals (gadv) were much more import than the basic ones (gbasic). The latter can be explained, first, by the fact that only two per cent of respondents stated that their innovation influenced mainly the back office (see table 6.3). Secondly, 'only back office innovations' are usually 'advanced' by their nature, as they require business process reengineering, automation, database integration, etc. Indeed, if we compare more closely the front office (1) and both front and back office (3), we also see that in the latter case (3), advanced goals (gadv) are more important than the basic ones (gbasic); in the case of the front office (1), the situation is opposite (see figure 7.10 graph 1).

Analysing the innovation results (graph 2), we see two developments compared to what was seen in the case of innovation goals. First, in the case of back office (2), the importance of advanced results (radv) is still larger than the basic results (rbasic); however, the difference is much smaller than in the case of innovation goals. Secondly, the importance of basic results (rbasic) compared to advanced results (radv) has been rising clearly compared to what we saw in the goals (graph 1). Moreover, when moving from goals to results, advanced and basic goals/results have shifted their position in terms of importance in both front and back office (3) (i.e. if gadv>gbasic then radv<rbasic). Both these developments (if comparing innovation goals to innovation results) can be explained by the fact that public sector innovators are more optimistic when they are describing their goals, compared to when they are describing their actual results.

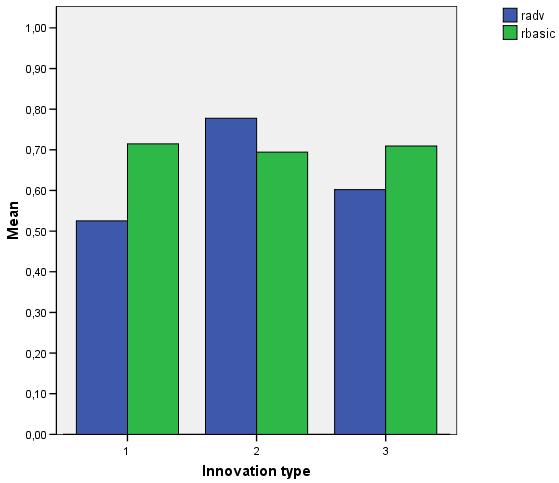
To identify any possible statistically significant differences between innovation types in the importance of innovation basic or advanced innovation goals and results, we performed ANOVA analysis. However, the univariate analysis did not show any statistically significant differences between different innovation types (see annex 14 for details).

Figure 7.10 Advanced and basic goals and results of innovation in public sector services: innovation type determinant

Graph 1



Graph 2



Note: gadv = advanced innovation goals; gbasic = basic innovation goals; radv = advanced innovation results; rbasic = basic innovation results. (2) 1 = service delivery (front office); 2 = process integration (back office); 3 = both front office and back office.

(B) Grouped supporting and hampering factors of innovation in public sector services: field determinant

In previous parts of the empirical analysis (chapter 5), we analysed the importance of different factors supporting and hampering innovation in public sector services (internal to the organisation and externally). These analyses were carried out using a list of possible, predefined factors influencing the innovation process. In addition, to clarify the results, the single most and single least important factors were identified. The initial list of supporting and hampering factors was then reduced to four statistically new factors (in case of internal supporting and hampering factors) and to five statistically new factors (in case of external supporting and hampering factors). The latter exercise was done in the previous chapter, using principal component factor analysis.

(B1) Internal factors

Following data performance during the principal component factor analysis, the new statistical factors developed for internal supporting and internal hampering factors of the innovation process in public sector services were similar (both for internal supporting and internal hampering factors). The factors were the following: (a) Top management (isf1/ihf1), (b) Structure and organisational culture (isf2/ihf2), (c) Operational management (isf3/ihf3), and (d) External cooperation (isf4/ihf4).

It was concluded already in the descriptive statistics chapter that innovation supporting factors were generally seen statistically significantly more important than innovation hampering factors. Figure 7.11 illustrates by types of innovation the performance of grouped factors supporting (isf, graph 1) and hampering (ihf, graph 2) innovation internally in public sector services.

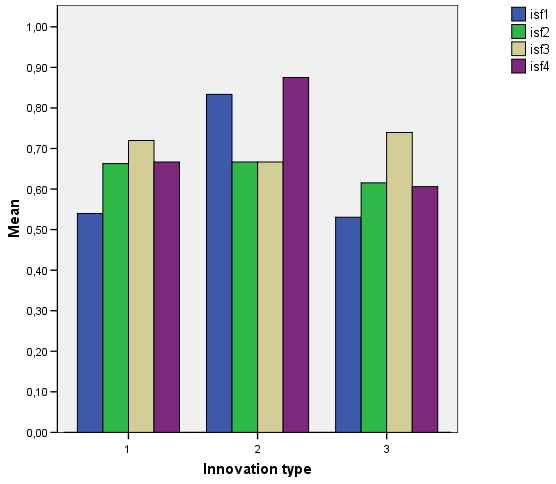
Analysing the internal innovation supporting factors (graph 1), we see that front office (1) and both front and back office (3) are performing relatively similarly in terms of influencing factors. In both types of innovation, operational management (isf3) appears to be the most important innovation driver. Moreover, in both types of innovation, operational management (isf3) is followed almost equally by organisational structure and culture (isf2) and external cooperation (isf4). In both types of innovation (1 and 3), top management influence (isf1) comes out as the least important internal innovation supporting factor. The factors influencing only back office innovations (2) score differently. In this type of innovation, external cooperation (isf4) together with top management (isf1) are the most important positively influencing internal factors. However, the fact that back office (2) innovations perform differently also highlights some doubts. These come from the fact that these cases represent only two per cent of all respondents. The tendency that operational management outperforms top management in both well-represented types of innovation indicates that top management commitment and support, as well as hierarchical top-down power (initial factors) might be important but not crucial in innovation success in public sector services. We have a strong argument to say that personal leadership of committed ‘key’ individuals, available motivation and tools of the project manager, together with open-minded managers (initial factors) give an important influence on public service innovation appearance and its success.

Looking at the innovation hampering factors internally (ihf, graph 2), we see that they score generally lower than internal supporting factors (isf, graph 1). In the case of front office innovations (1), organisational structure and culture (ihf2), as well as external cooperation (ihf4) were the most influential hampering factors. In both front and back office (3), all four external hampering factors affect the innovation process relatively equally. Interestingly, in back office innovations (2), all four internal hampering factors appear to be more important than in two other types of innovations (1 and 3). However, due to a relatively small representation of back office innovations in the responding sample, the latter tendency might not be too adequate.

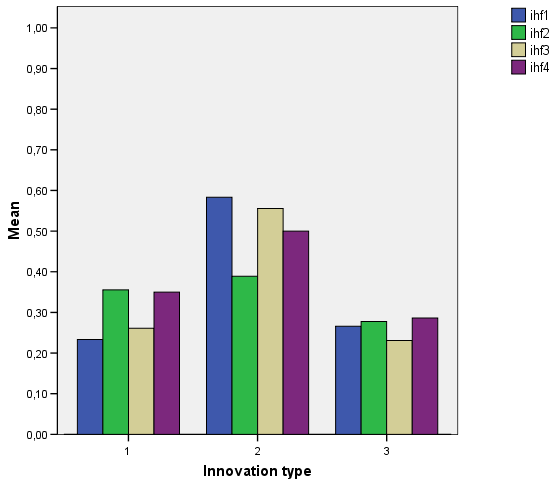
To identify any possible statistically significant differences between innovation types in the importance of different internal innovation supporting and hampering factors, we performed ANOVA analysis. However, the univariate analysis did not show any statistically significant differences between different innovation types (see annex 14 for details).

Figure 7.11 Internal factors supporting and hampering innovation in public sector services: innovation type determinant

Graph 1



Graph 2



Notes: (1) isf = internal supporting factors; ihf = internal hampering factors. (2) isf1 and ihf1 = top management; isf2 and ihf2 = structure and organisational culture; isf3 and ihf3 = operational management; isf4 and ihf4 = external cooperation. (3) 1 = service delivery (front office); 2 = process integration (back office); 3 = both front office and back office.

(B2) External factors

While the new statistical factors developed for internal factors were similar for supporting and hampering factors, due to data performance in principal component factor analysis, the new statistical factors developed for external supporting versus hampering factors were different (see table 7.3). In the case of external supporting factors (esf, graph 1), the new statistical factors after the grouping exercise were the following: (a) Policy (esf1), (b) Users (esf2), (c) Economy (esf3), (d) Technology and partners (esf4), and (f) Technological experiences (esf5). In the case of external hampering factors (ehf, graph 2), the new statistical factors after the grouping exercise were the following: (a) Policy (ehf1), (b) Risks (ehf2), (c) Users and partners (ehf3), (d) Finances (ehf4), and (f) Laws and regulations (ehf5).

Figure 7.12 shows fundamental differences between different innovation types in public services if we collate the five new statistical factors externally supporting (esf, graph 1), and other five externally hampering (ehf, graph 2) innovation in public sector services. To a lesser extent than in case of internal factors, however, the external supporting factors are also assessed as being more important than the external hampering ones.

From the supporting factors' side (graph 1 in figure 7.12), users (esf2) were assessed as the most important external factor supporting innovation process in all three types of public service innovations. This pattern was also followed by the next two factors – technology and partners (esf4) and policy (esf1). In front office innovations (1) and both front and back office innovations (3), economy (isf3) was the least important supporting factor. As said earlier, the relatively low importance of economic factor (isf3) might be linked to the fact that it includes quite opposite initial factors (competition and budgetary pressure). Knowing the initial factors behind the new statistical factor 'users' (esf2), we can surely say that user demand and user trust are the two most important factors externally supporting all types of innovation in public services.

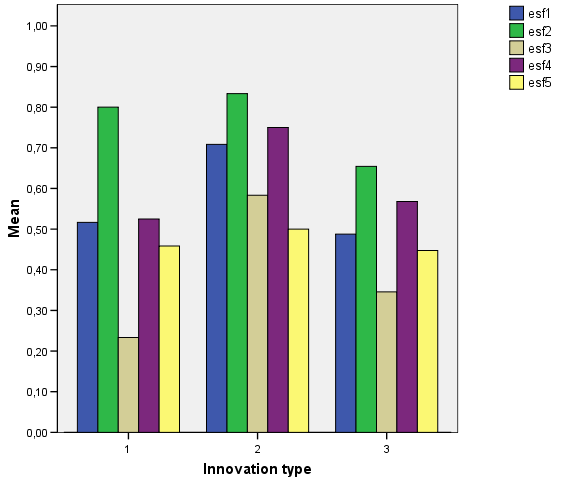
Analysing the external hampering factors side in the frame of three innovation types (graph 2 in figure 7.12), we see that in two out of three types of innovations, in front office innovations (1) and both front and back office innovations (3), the most important external barrier was related to finances (ehf4). Therefore, we can conclude that the lack of finances have a negative effect in public service innovation development. However, we should keep in mind that the external hampering factors (graph 2) in

general were assessed as being less important compared to the external supporting factors (graph 1). The general pattern of external hampering factors was similar to front office innovations (1), and both front and back office innovations (3). The back office innovations (2) faced stronger external hampering factors, especially linked to different risks (ehf2), as well as to users and partners (ehf3). The higher importance of risks in this innovation type might be linked to the fact that all back office innovation cases come from the UK, where due to the size of the country projects are larger, more costly, and therefore financially and politically more risky.

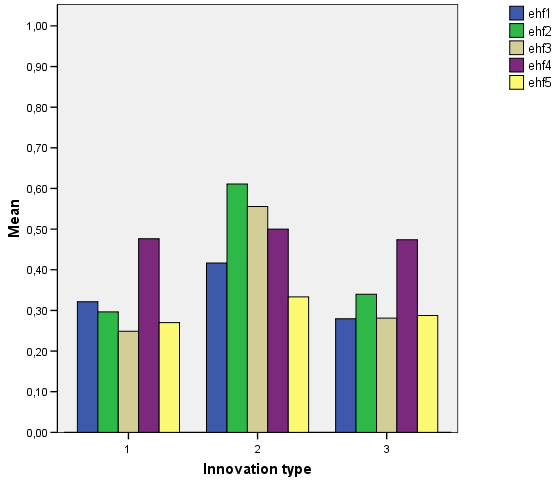
To identify any possible statistically significant differences between innovation types in the importance of different external innovation supporting and hampering factors, we performed ANOVA analysis. However, the univariate analysis did not show any statistically significant differences between different innovation types (see annex 14 for details).

Figure 7.12 External factors supporting and hampering innovation in public sector services: innovation type determinant

Graph 1



Graph 2



Notes: (1) esf = external supporting factors; esf1 = policy; esf2 = users; esf3 = economy; esf4 = technology and partners; esf5 = technological experiences. (2) ehf = external hampering factors; ehf1 = policy; ehf2 = risks; ehf3 = users and partners; ehf4 = finances; ehf5 = laws and regulations. (3) 1 = service delivery (front office); 2 = process integration (back office); 3 = both front office and back office.

7.7. Summary and considerations

The first part of this chapter used principal component factor analysis (PCA) techniques to group the initial innovation goals and results, as well as organisational and external innovation supporting and hampering factors into meaningful meta-groups (new statistical factors). The exercise was considered successful, as it was possible to group the initial goals and results, as well as the innovation influencing factors into new statistical factors. The new statistical factors developed are listed in section 7.3. These new factors were then used in univariate (ANOVA) analysis of variance of country, field and innovation-type specific determinants of the innovation process.

The chapter carried out univariate analyses to test the statistical significance in differences between countries in the importance of new statistical factors supporting or hampering innovation (internally and externally) created in chapter 6. The results of these analyses can be closely followed by looking at figures and elaborations in the text. As the results show (section 7.4), there are many statistically significant differences across countries and we therefore accept proposition PS2.3 that the nature of public service innovations depends on the country they are from. These results contrast with most of the comparative work on cultures (see Didero *et al.*, 2008), which are based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states. The sub-chapter also provided inputs against the acceptance of proposition PS4, stating that, overall, the main characteristics and driving forces of the public service innovation system do not differ across different countries. Indeed, further analyses are needed, to be more confident in accepting or rejecting this proposition.

The focus of sub-chapter 7.5 was on field-specific determinants. In order to study these, we developed respective graphs and univariate (ANOVA) analyses were carried out to test the statistical significance in differences between fields of public service in the importance of certain new statistical factors supporting or hampering innovation (internally and externally). Contrary to what the literature suggests, the empirical evidence show that there are very few statistically significant differences if comparing innovation goals, internal and external innovation supporting as well as hampering factors by the field of innovation. Therefore, we reject sub-proposition PS2.1 that the nature of public service innovations depends on the field they belong to, even if it is known from the practice of private sector

innovation research that there might be several factors, for example industrial field and organisational structure, which are determining the innovation intensity and success of firms. Sub-chapter 7.6 was focusing on innovation-type specific determinants. For that purpose, also appropriate graphs were developed and univariate (ANOVA) analyses carried out to test the statistical significance in differences between public service innovation types on the importance of new statistical factors supporting or hampering innovation (internally and externally). However, in terms of basic or advanced innovation goals and results, different internal and external innovation supporting and hampering factors, the univariate analysis did not show any statistically significant differences between different innovation types (see annex 14 for details). Therefore, we reject sub-proposition PS2.2 stating that the nature of public service innovations depends on the type they are.

The above-mentioned three determinant analyses suggest to partly reject proposition PS2, stating that that the nature of public service innovations depends on different determinants. As we saw, the only determinant with statistically significant impact in many areas was 'country'. In terms of determinant 'field', the univariate analysis showed only one statistical difference in external hampering factor – policy (ehf1), which was significantly more important in education services (2) compared to business services (5) [(2)>(5)]. The differences in the importance of other factors between different fields of public service were not statistically significant (see annex 13 for details). Furthermore, as said earlier, in terms of determinant 'innovation type', there were no statistical differences found.

These results clarified the theoretical discussion in the literature about framework factors determining innovation in public sector services (see for example Mohr, 1969; Cornford *et al.*, 2006; Koch *et al.*, 2005; Didero *et al.*, 2008). The analysis and answers to propositions presented above also facilitate our research towards identifying the specifics of public service innovation system across four European countries.

8. SYNTHESIS OF THE RESEARCH RESULTS

> *"For artists diving into a new technology, it is a triple short-cut to mastery: you get a free ride on the novelty of the medium; there are no previous masters to surpass; and after a few weeks, you are the master. Try that with the violin."*
> Stewart Brand.

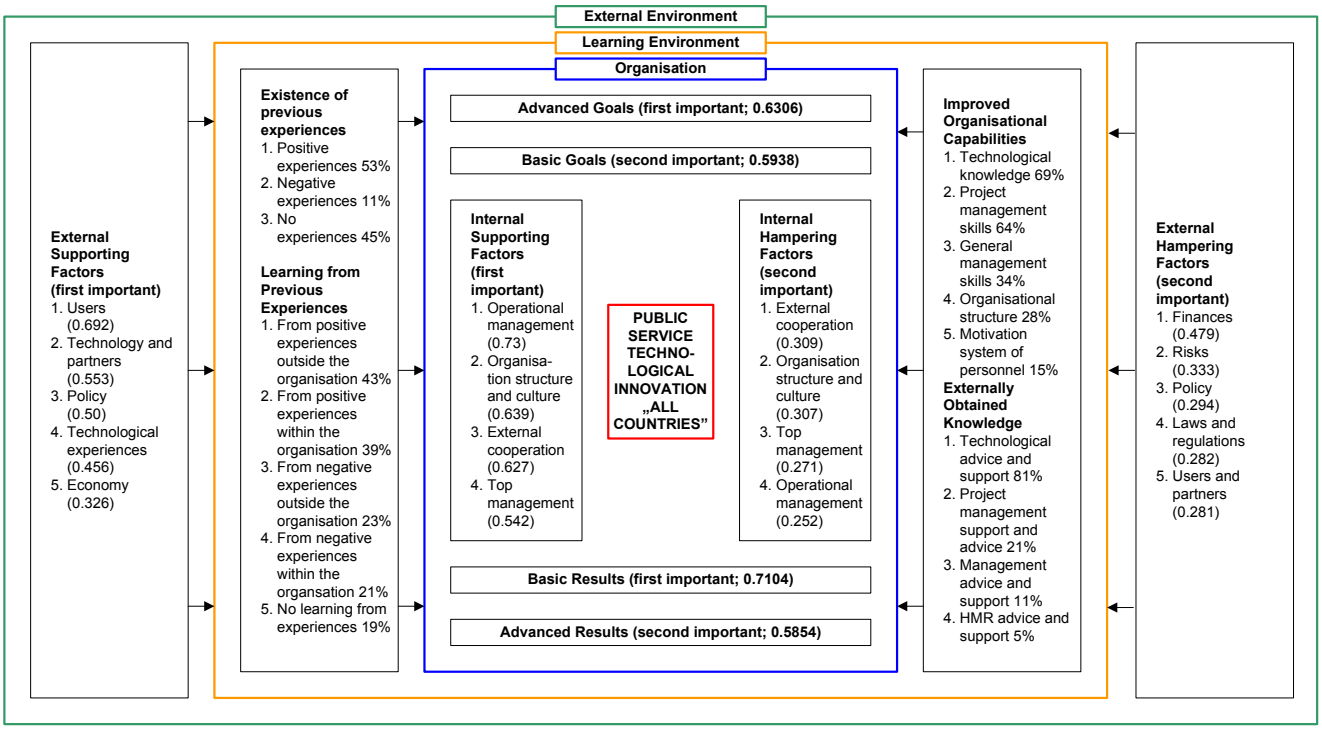
Literature argues that innovation takes place in a system consisting of individuals, firms and institutions and within a certain cultural and regulatory framework. The present chapter analyses the results of the empirical analysis within the proposed theoretical framework to describe the dynamics of the public service innovation system. The chapter starts with the overall underlying configuration of the public service innovation system based on the research results. This is followed by a country-specific picturing of the public service innovation systems of the UK, Denmark, Finland and Estonia. The final sub-chapter presents the summary of the research results in comparison to other theoretical and empirical works on public sector innovation. The latter is achieved using original sub-research questions and propositions set up in chapter 5.

The theoretical framework for this research was developed in chapter 4, in which the empirical on-the-ground case study survey was carried out. The system-concept had three main dimensions. Firstly, the external environment that represents the influence of political leadership, public policies, and laws and regulations on the innovation process in public services. Secondly, the learning environment representing the picture of innovation-related organisational learning in public services – including learning from previous/similar innovations, internally improved organisational capabilities for innovation, areas of externally obtained knowledge, etc. Thirdly, the organisational environment that represents innovation goals and results as well as intra-organisational factors influencing the innovation process. Chapters 6 and 7 performed different analyses on the case study survey results. We started with descriptive analyses of the survey results describing the multidimensionality and relative importance of different factors influencing technological innovation in public sector services (chapter 6). This was followed by principal component factor analysis to narrow down and group the long list of innovation goals and results, as well as supporting and hampering factors, to make a shorter list of more generalised meta-factors. We then analysed the impact of country, field, innovation-type specific determinants on these meta-factors as well as carried out univariate (ANOVA) analyses to test the statistical significance in differences between determinants (chapter 7).

8.1. Overall dynamics of the configuration of public service innovation system

The empirical chapters of the present thesis have shown us that the picture behind public service innovations is much more multi-faceted than one might initially think. Therefore, we can surely argue that the literature of public sector innovation that is full of normative assertions and/or pejorative arguments with little serious empirical work behind it (as stated by Osborne and Brown, 2005) has its limits and this research has brought us a little closer in understanding and managing innovation in public sector services. Based on the empirical results, figure 8.1 shows the relative importance of different factors influencing the innovation process in public service development in three dimensions – the external environment, learning environment and organisational environment jointly for all four countries. Expect for the learning environment, we used new statistical factors developed in chapter 7 using principal component factor analysis to illustrate the nature of public service innovation systems (figures 8.1 to 8.5).

Figure 8.1 Overall dynamics of the configuration of public service innovation system in the UK, Denmark, Finland and Estonia



Notes: (1) All factors and learning methods are given in the sequence of importance (i.e. first=the most important; last=the least important). (2) The overall importance levels if indicated 'first important' or 'second important' show the importance of the whole set of factors (see chapter 5), i.e. external supporting factors versus external hampering factors; internal supporting factors versus internal hampering factors. (3) The importance levels of grouped (meta) external supporting factors, external hampering factors, internal supporting factors, external supporting factors, basic goals, advanced goals, basic results, and advanced results are given on a scale of 0 'not important' and 1 'very important'. (4) The existence of previous experiences, learning from previous experiences, improved organisational capabilities, and externally obtained knowledge are given in percentages, indicating the amount of responding organisations, which used the particular learning method.

As of the broadest conclusion from the public service innovation system pictured above (for all four countries), the internal supporting factors are statistically significantly more important for the innovation process in the public services than the external supporting factors. Within this, indeed, the prominent position of personal leadership might be slightly biased as mostly persons, who were responsible or linked to the particular public service innovation development, filled in the questionnaires. However, the results support the basic statement of Drucker (1985: 30), who stated "entrepreneurs innovate", as well as the importance of such 'key' individuals in the innovation process stressed by many authors (see Rothwell, 1992; Tidd *et al.*, 2001; Koch and Hauknes, 2005). At the same time, the external innovation hampering factors are statistically significantly greater in

importance than the internal hampering factors. Moreover, the internal factors overall (supporting + hampering) are statistically significantly more important in the public service innovation process than external factors are overall. This difference gives us the confidence to say that in general, in order to succeed in public service technological innovations, organisational factors are more important than the ones of external environment. This means that the existence of written strategy, open minded managers, and 'product champions' who are ready and motivated to carry through the project, are more important than external influences, i.e. political demand, budgetary pressure, or appropriate laws and regulations. Also, comparing merged supporting (external + internal) and hampering (external + internal) factors, one can clearly see that the importance of supporting factors very significantly out performs the importance of hampering factors. This might be partly so as it was a best practice research. However, in order to succeed in public service innovations, the innovation-motivating forces should be greater than the obstacles. From the country difference perspective, these are greater in terms of hampering factors (especially internal hampering factors) than for supporting factors.

(A) Learning environment

From the learning perspective, this thesis has shown that technological innovation in public sector services requires a broad range of managerial and organisational improvements, and that external learning and consultancy plays a positive role in successful public service innovations. Here we see a slight contradiction, as the internal supporting factors in general were statistically significantly more important for the innovation process in the public services than the external supporting factors. However, in our sample, external learning was heavily skewed towards one type of knowledge. Namely, 81 per cent of public organisations obtained external technological advice/support to innovate; this was followed by project management skills and advice: 21 per cent of the organisations. Only 11 per cent of public organisations obtained external management advice and support, and external human resource management skills and support was obtained by as few as 5 per cent of public organisations. Similarly, internally the most improved organisational capability to innovate was technological knowledge, by 69 per cent of organisations. Project management skills were internally upgraded by 64 per cent, general management skills by 34 per cent, organisational structure by 28 per cent, and motivation system of personnel by 15 per cent of public organisations.

The survey also showed that innovation-related learning in public sector services is seen to be cumulative – it can result from the previous positive and negative experiences, internally and externally. Organisations were slightly more likely to learn from others than their own previous experiences; they also learned more from positive than negative experiences. Overall, as much as 53 per cent of organisations had previous positive experiences with similar innovations, compared to 11 per cent of organisations having negative experiences. Slightly less than half of the public sector organisations (45 per cent) did not have any previous experiences with similar innovations. Almost one-fifth of public organisations reported having not learned from any previous experiences, whether internal to the organisation or externally. The fact that almost half of public organisations under investigation did not have their own respective previous experiences shows that innovation in the public sector, generally, tends to be more an ad hoc project-based thing than a result of continued and more systemic development processes. To some extent, external best practices and policy learning can compensate for this; however, it does not substitute the mentality and effectiveness of a naturally innovative organisation.

(B) Organisational perspective

From the managerial perspective, factors (including goals) influencing the innovation process in public sector services differ to some extent from those known from the private sector (see chapter 6). Competitiveness[40] and service cost, which are important drivers in the private sector, were both among the least important innovation goals rated by the respondents. Innovation goals in the public sector were not too polarised – despite the responding organisations having many different innovation goals, the major ones emerge clearly: improvements in service quality, going online, responding to user needs, and improving the take-up of the service. Howells and Tether (2004; sub-chapter 4.1), for example, discovered a similar dominant position of quality issues in relation to the aim of innovation in their private sector services' analysis. Also, most of the public sector organisations in the survey track the performance of their innovations and compared to the initial expectations, the innovation results are mostly rated as good (60 per cent) or excellent (30 per cent).

[40] Competition means the presence of alternative service providers, both in the public (e.g. other hospital, school or library) as well as private sector (e.g. commercial banks in providing personal identification services).

What is interesting to see after the principal component factor analysis is that in the beginning of the innovation, overall, the 'advanced goals' set slightly dominated over the 'basic goals'. This means that public organisations were setting up more complex/advanced tasks for their innovation, i.e. to raise service diversity, to improve the quality of the service, to reduce time spent on service delivery as well as to reduce costs. However, if one looks at the results, then the 'basic results' dominate over the 'advanced results'. This means that despite more complex goals, more primitive results were achieved with the innovation. The service was simply online, modern technologies were used, transparency improved, social or political popularity gained, or the take-up of the service was improved.

Within the organisations, internal innovation supporting factors clearly dominated over the respective hampering factors. From the principal component factor analysis, the group 'operational management' was clearly the most important set of internal factors leading to successful innovation in public services. Organisational structure and culture, external cooperation and top management followed this. Within the operational management group, there are factors like personal leadership/committed key individuals, open-minded managers, and available mandate, motivation and tools of the project manager. Based on this one can confidently say that innovation in public service organisations is people-centric. These are people who directly lead the innovation projects – literature has called them guerrillas, policy entrepreneurs, revolutionary and missionary civil servants, inventors, adaptors, advocates, brokers or innovation champions.

From the internal hampering factors' perspective, the groups of factors were different, if not to say the opposite to supporting factors. The most important group of internal hampering factors was external cooperation, followed by organisational structure and culture, top management, and operational management. Weak external cooperation means weak cooperation with technology suppliers, lack of market knowledge, and weak cooperation with future users or user-groups (as individual factors within the group called external cooperation). We can see it throughout the thesis that external technological cooperation and respective learning are certainly keys to success as well as one of the largest bottle-necks hampering the innovation projects and therefore certainly also leading to failures. There can be several reasons for that and problems can equally start from demand side (public organisations), supply side (technology providers), but also from regulations' side, i.e. rules of public procurement. We will elaborate this more in the policy implication part of the next chapter (chapter 9).

(C) External environment

The importance of external factors influencing the innovation process in public service organisations slightly but statistically significantly underperforms the importance of internal factors. Within the external factors, the supporting factors slightly dominate over the hampering factors across all countries. Principal component factor analysis showed that group users (composed by the initial factors of user demand and user trust) was the most important external supporting factor, followed by technology and partners, policy, and the economy. From the external hampering factors' perspective, the composite factor finance was the most important one, followed by risks, policy, laws and regulations, and users and partners.

It is generally assumed that public sector institutions are non-innovative because of their bureaucratic nature with strict rules, rigid regulations and no real competition. Therefore, it can be expected that innovation in the public sector require changes in laws and regulations; moreover, it requires significant contribution from public policy. However, contrary to initial expectations, the current study showed that relatively few public service innovations required changes in laws and regulations (21 per cent of all responding organisations; see table 6.16). Appropriate laws and regulations were also rated as relatively non-important in the question on external factors supporting innovation (see figure 6.6); the same was true in the case of legal and regulatory barriers that were relatively unimportant as external factors hampering innovation (see figure 6.8). This situation did not change also after the principal component factor analysis. Indeed, positive public policy support is much more important (see table 6.17) than changes and support in laws and regulations. Across all countries, only 35 per cent of organisations reported not having any influence from public policies while innovating. From the innovation financing perspective, the composite factor economy was only the fifth most important external factor supporting innovation. Indeed, the composite indicator finances appears to be the most important external hampering factor to public service innovation as said earlier. The latter can, however, be slightly biased, as the easiest thing to say if something does not work out is always 'insufficient resources allocated'.

8.2. Country-specific characteristics of the public service innovation system

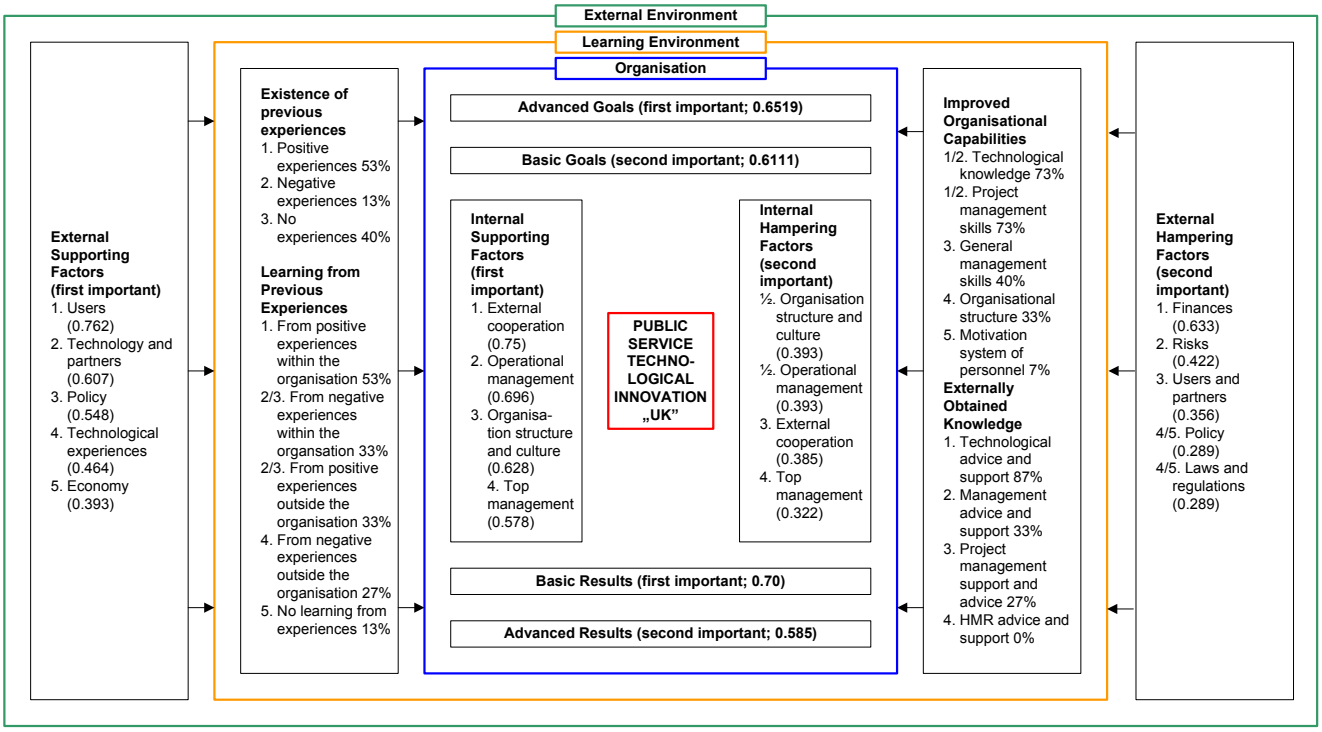
(A) United Kingdom

The survey has shown that from the external factors perspective, public service innovation systems look very similar across countries. The variations are much larger within the organisations as well as in their learning environments. The larger country size of the UK and related larger and more complicated institutional setup might make the innovation process more costly, and therefore also riskier, as the survey showed. The survey also showed that risks are mitigated and confidence gained through the political demand and commitment to long-term major projects, strong top management commitment and support, close cooperation with technology suppliers and future users, as well as just through better market (demand) knowledge, which all are relatively more important in the UK than in other countries. More important hampering factors in the UK were the lack of supportive strategy, stagnating organisational culture, rigid structures, and the existence of previous failures – all common issues to larger countries. Moreover, even if not important in absolute terms, gaining social and political popularity as a goal of innovation was assessed as being slightly more important in the UK than in other countries. Principal component factor analysis showed that the UK was the only country where the factor external cooperation was weighted as the most important factor supporting the innovation process; in other countries this was operational management. However, the latter was seen as the second most important internal hampering factor in the UK, while top management was the least important factor hindering the innovation process internally (in contrast to most other countries). Also, external cooperation was weighted as a relatively less important internal hampering factor in the UK than in other countries, which shows the relative advancement of external, often technological cooperation in the UK public service organisations. This proposition is supported also by the fact that the UK public service organisations were most intensively using external technological advice and support while innovating (87 per cent). The UK institutions also used relatively more external general management advice and support (as organisations are larger) than organisations in other countries did. Interestingly, at the same time no external human resource management and support was used to support the public service innovation process in the UK.

As public service organisations in other countries, the UK institutions had some previous experience with similar innovations – 53 per cent had positive and 13 per cent had negative ones; they also learned firstly from their own experiences and then externally. However, as much as 40 per cent of public service organisations in the UK did not have any previous experiences while innovating and 13 per cent also did not learn from external experiences.

The UK public service organisations together with Estonian counterparts both set more advanced innovation goals for their innovations then the Danes and Finns did. However, innovations produced mostly basic outcomes across countries, not the advanced ones, as was shown by the principal component factor analysis (see annex 11). The UK public service organisations were most optimistic in terms of their innovation results (47 per cent rated them excellent and 40 per cent as good). Figure 8.2 shows the relative importance of different factors within the public service innovation system in the UK.

Figure 8.2 Dynamics of the configuration of public service innovation system in the UK



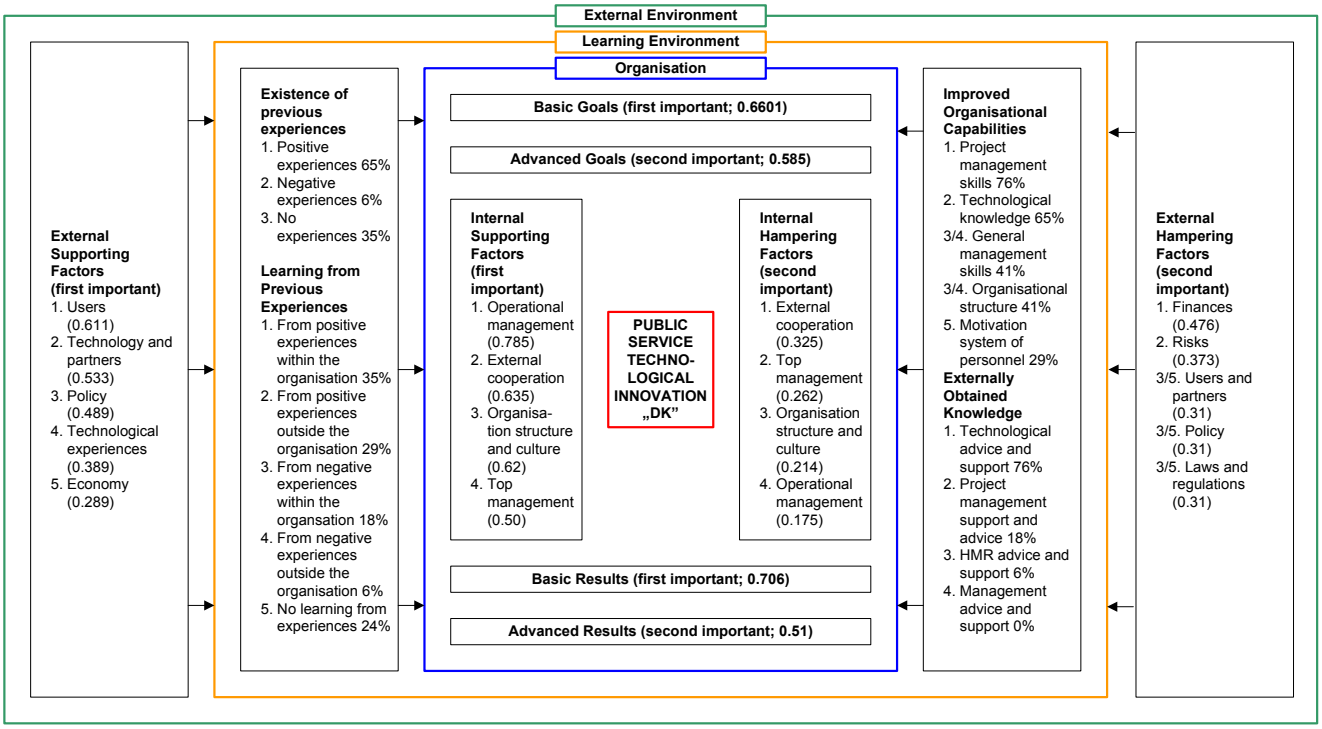
Notes: (1) All factors and learning methods are given in the sequence of importance (i.e. first=the most important; last=the least important). (2) The overall importance levels if indicated 'first important' or 'second important' show the importance of the whole set of factors (see chapter 5), i.e. external supporting factors versus external hampering factors, internal supporting factors versus internal hampering factors. (3) The importance

levels of grouped (meta) external supporting factors, external hampering factors, internal supporting factors, external supporting factors, basic goals, advanced goals, basic results, and advanced results are given on a scale of 0 'not important' and 1 'very important'. (4) The existence of previous experiences, learning from previous experiences, improved organisational capabilities, and externally obtained knowledge are given in percentages, indicating the amount of responding organisations, which used the particular learning method.

(B) Denmark

Compared to the UK, in smaller countries often other issues dominate in the public service innovation process and system. In Denmark, transparency issues are rated as more important than in other countries. Danish innovators face relatively less internal hampering factors while innovating than their colleagues in other countries. At the same time, external hampering factors such as the lack of supportive policies, absence of relevant good examples and digital divide are relatively more important in Denmark than in other countries. Danish innovators overemphasise (compared to other countries) the importance of different internal supporting factors, such as open-minded managers, the existence of personal leadership and committed 'key' individuals, as well as flexible organisational structure together with the learning capabilities of the organisation. The Danish pattern might be explained by the fact that a large part of the public sector innovation experiments in the survey were carried out on an ad hoc basis under a larger project supporting regional innovation projects in Northern Jutland. However, as much as 65 per cent of Danish public service organisations stated having previous experiences with similar innovations (see figure 8.3), the highest ratio across countries, and as few as 6 per cent had had negative experiences, the lowest ratio across all countries. At the same time, 24 per cent of public service innovators in Denmark did not learn from previous experiences, internally or externally – again the highest ratio across countries.

Figure 8.3 Dynamics of the configuration of public service innovation system in Denmark



Notes: (1) All factors and learning methods are given in the sequence of importance (i.e. first=the most important; last=the least important). (2) The overall importance levels if indicated 'first important' or 'second important' are showing the importance of the whole set of factors (see chapter 5), i.e. external supporting factors versus external hampering factors, internal supporting factors versus internal hampering factors. (3) The importance levels of grouped (meta) external supporting factors, external hampering factors, internal supporting factors, external supporting factors, basic goals, advanced goals, basic results, and advanced results are given on a scale of 0 'not important' and 1 'very important'. (4) The existence of previous experiences, learning from previous experiences, improved organisational capabilities, and externally obtained knowledge are given in percentages, indicating the amount of responding organisations, which used the particular learning method.

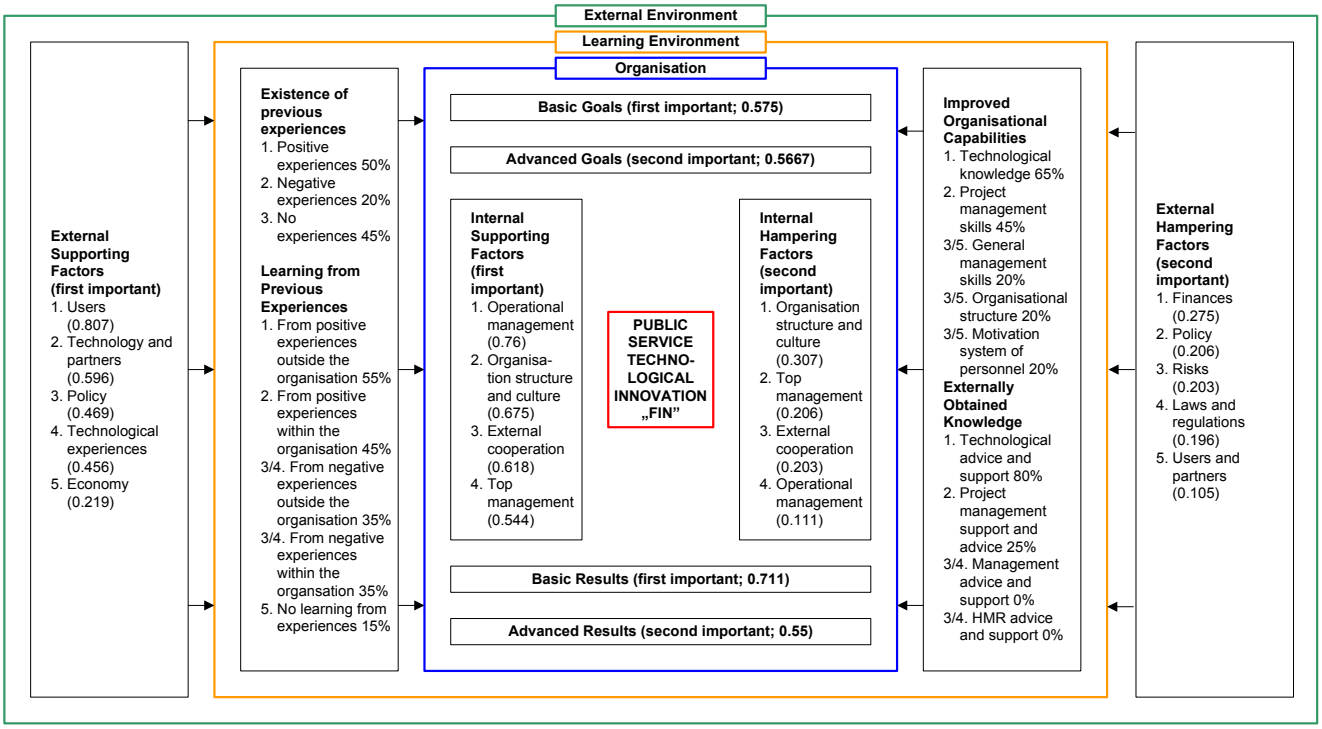
Principal component factor analysis showed that Danish public service organisations dominated over other country counterparts in setting up basic innovation goals (versus advanced goals). While in other countries technological knowledge was the most improved internal capability to innovate, in Denmark this was project management skill, only followed by technological knowledge. None of the public service organisations in Denmark claimed having used any external general management support while innovating – an indication that innovations were more ad hoc initiatives and with lower influence, importance or risks. Finally, the positive role of operational management in the innovation process was the highest in Denmark, over all other countries in the survey. At the same, factors such as top management and organisational structure and culture were relatively less important internal innovation supporters in Denmark than in other countries.

(C) Finland

Public service innovation goals in Finland tend to be relatively user-oriented (see chapter 6 for descriptive survey results). This is supported by the results of the principal component factor analysis, where the importance of users as external supporting factor for innovation were rated the highest compared to all other countries (see annex 11). Internal supporting factors, such as supportive organisational strategy and innovation accepting organisational culture, tend also to be more important in Finland than in other countries. The importance of external issues, such as appropriate laws and regulations, the existence of good examples, good cooperation with partners (including technology providers), and user demand together with trust, are signs of a more systematic work and relatively higher sophistication of the public service innovation process in Finland. Stronger external commitment to public service innovation is indicated also by the fact that the importance of none of the external hampering factors in Finland dominates over the ones of other countries.

Finnish public service organisations have the highest rate in internal negative experiences with similar innovations – 20 per cent (see figure 8.4). At the same time, together with the UK, Finns are the most active learners from previous experiences, mostly from positive experiences outside the organisation (55 per cent) and inside the organisation (45 per cent). Only 15 per cent of public service innovators in Finland reported having not learned from any previous experiences, whether internally or externally. Together with the UK, Finnish public service organisations obtained slightly more external project management advice and support than other country organisations did. However, no external general management or human resource management advice and support were used by Finnish public service organisations while innovating.

Figure 8.4 Dynamics of the configuration of public service innovation system in Finland



Notes: (1) All factors and learning methods are given in the sequence of importance (i.e. first=the most important; last=the least important). (2) The overall importance levels if indicated 'first important' or 'second important' are showing the importance of the whole set of factors (see chapter 5), i.e. external supporting factors versus external hampering factors, internal supporting factors versus internal hampering factors. (3) The importance levels of grouped (meta) external supporting factors, external hampering factors, internal supporting factors, external supporting factors, basic goals, advanced goals, basic results, and advanced results are given on a scale of 0 'not important' and 1 'very important'. (4) The existence of previous experiences, learning from previous experiences, improved organisational capabilities, and externally obtained knowledge are given in percentages, indicating the amount of responding organisations, which used the particular learning method.

Similar to other countries, technological advice was the most important internally improved capability in Finnish public service organisations while innovating (65 per cent of the organisations). Accordingly, technological advice and support were the first externally obtained capabilities to innovate in public services (80 per cent). Finally, compared to the other countries in the survey, the relative importance of organisational structure and culture as an internal factor supporting innovation was higher in Finnish public service organisations (see annex 11). Together with Denmark, Finnish public service organisations also saw top managements as an important hampering factor for innovation, in contrast to the UK and Estonia.

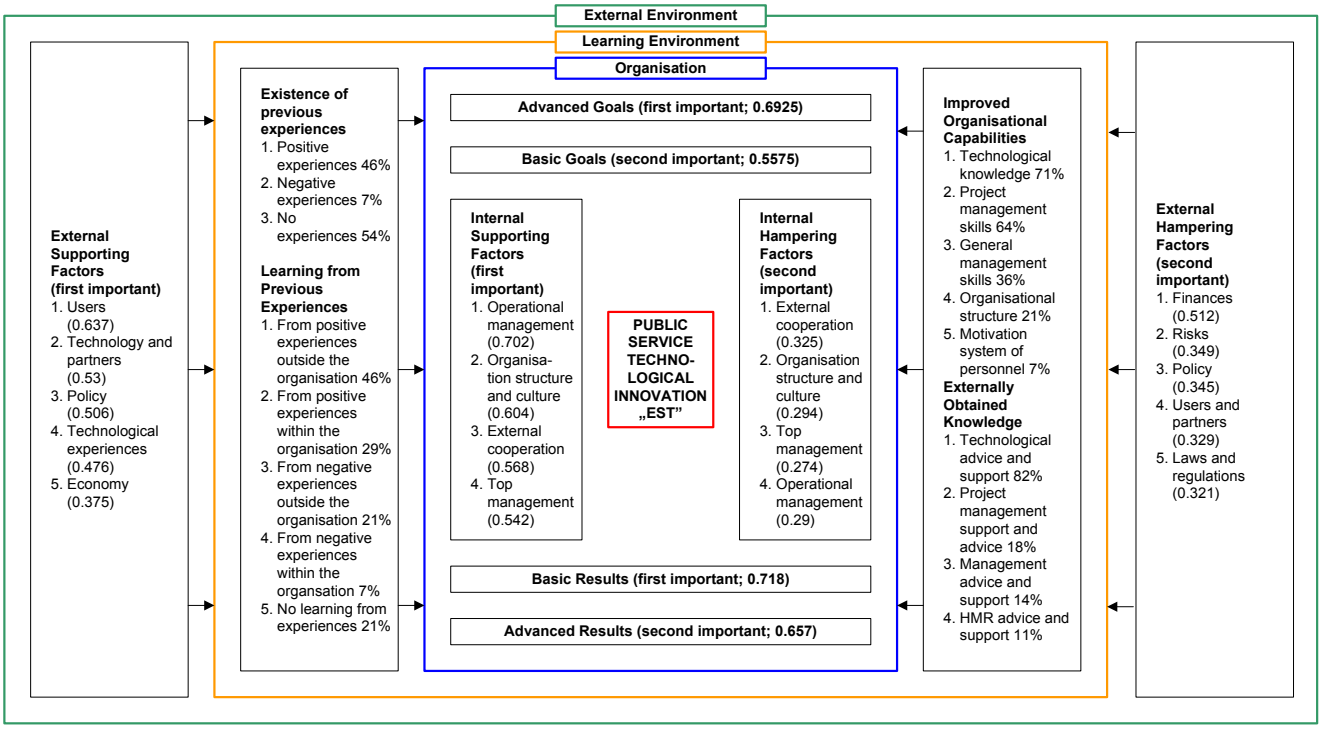
(D) Estonia

The public service innovation goals tend to be more advanced in Estonia than in other countries, as they are more focused on the issues related to the raised service diversity (including personalised services) and reduced time spent on service delivery, etc. (see chapters 6 and 7). External factors, such as supportive policies, appropriate laws and regulations, competition, and technology push, are also relatively more important in Estonia than in other countries. From another perspective, no or weak political demand, no political commitment to long-term major projects, inappropriate laws and regulations, lack of financial resources, lack of trust and digital divide are relatively more important external hampering factors in Estonia compared to other countries. Internally, good knowledge of the existing technologies is relatively more supporting, and lack of ideas more hampering the innovation process in Estonia. The relative advancement of the Estonian public service innovation process can be explained by the small size of the country, as projects are smaller and, therefore, less risky to carry out. Also, relatively smaller national wealth (i.e. resources available) together with the advanced infrastructure (telecommunication, electronic banking, ID card, digital signature, etc.) motivates producing creative technological solutions to traditional problems. Relatively young socio-economic structure might also be less reluctant to new ideas compared to the countries with long traditions and historical habits of doing things.

Estonian public service organisations had relatively fewer positive (46 per cent) and negative (7 per cent) experiences than other countries on average did, and as much as 54 per cent of Estonian innovators did not have any previous experiences while innovating (see figure 8.5). As much as 21 per cent of Estonian public service organisations did not learn from previous experiences, whether internal to the organisation or externally – the second highest percentage after Denmark.

Estonia was the only country in the survey where public service organisations obtained all kinds of external capabilities while innovating. In addition to technological advice (82 per cent) and project management support (18 per cent), also general management advice and support (14 per cent) as well as human resource management assistance (11 per cent) were used.

Figure 8.5 Dynamics of the configuration of public service innovation system in Estonia



Notes: (1) All factors and learning methods are given in the sequence of importance (i.e. first=the most important; last=the least important). (2) The overall importance levels if indicated 'first important' or 'second important' are showing the importance of the whole set of factors (see chapter 5), i.e. external supporting factors versus external hampering factors; internal supporting factors versus internal hampering factors. (3) The importance levels of grouped (meta) external supporting factors, external hampering factors, internal supporting factors, external supporting factors, basic goals, advanced goals, basic results, and advanced results are given on a scale of 0 'not important' and 1 'very important'. (4) The existence of previous experiences, learning from previous experiences, improved organisational capabilities, and externally obtained knowledge are given in percentages, indicating the amount of responding organisations, which used the particular learning method.

From the external supporting factors perspective, the composite factor technological experiences (consisting of the existence of good examples, including best practices, and technology push, including lobbing by technology providers) was rated as more important in Estonia than in all other three countries in the survey. The same is true in the case of the composite indicators policy, and laws and regulations under the external hampering factors category. These were both rated as more important in Estonia than in other three countries, even if not the most important factors in absolute terms (these were finances and risks).

8.3. Summary of the research results in comparison to other theoretical and empirical works on public sector innovation

The previous sections (8.1 and 8.2) presented the results of our experimental survey of public sector innovativeness in the theoretical framework developed in chapters 4. Relying on the data of our exploratory survey, the chapter first drew a picture of the overall underlying configuration of the public service innovation system. This was followed by country-specific constructs of the same systems structure, picturing the composition public service innovation systems in the UK, Denmark, Finland and Estonia.

This sub-chapter is meant for interpretation of our survey results in a broader context of theoretical and empirical understandings of public sector innovation. We do it in the framework of the propositions defined in chapter 5, the validity of which was tested in chapters 6 and7. These propositions were set up based on contradicting theoretical views drawn from the literature (chapters 2 and 4) and the few existing empirical public sector innovation studies (chapter 3). In addition to these propositions, chapters 6 and 7 also provided answers to our four following sub-research questions:

- Managerial perspective – What are the key-features influencing, supporting and hampering, the development and implementation of successful, technologically innovative public sector services (SRQ1)?
- Learning perspective – Which managerial and organisational improvements are necessary to innovate in public sector services (SRQ2)?
- Technological perspective – What is the importance of technological knowledge in the public service innovation process, where and how it is developed (SRQ3)?
- Systems perspective – What does the composition and dynamics of public sector (service) innovation system look like across countries (SRQ4)?

The ultimate aim of the research was to answer the main research question (RQ) of the thesis: "What is relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of the public service innovation system in four European countries?"

Overall, our results of the empirical survey and analyses propose to accept or reject research propositions as presented in table 8.1. After the table presented below, reasoned answers to each of the sub-research questions together with respective propositions are given.

Table 8.1 Accepting or rejecting the research propositions

Area	Propositions*	Accepted / rejected**
MANAGEMENT	PM1: Factors (including goals) influencing the innovation process in public sector services differ to some extent from those known from the private sector.	Accepted
	PM2: Innovation goals in the public sector are equally polarised.	Neutral
	PM3: Innovation goals in the public sector are technically achieved (i.e. technologically innovative service exists), but the ways in which they are successful fall below the initial expectations (rated as average or poor).	Rejected
	PM4: Innovation supporters in the public sector can be equally internal to the organisation and external.	Rejected
	PM5: Innovation barriers in the public sector are predominantly internal to the organisation.	Rejected
	PM6: Personal leadership (i.e. existence of 'key' individuals) is an internally dominating factor supporting innovation in public sector services.	Accepted
LEARNING	PL1: Technological innovation in the public sector services requires a broad range of managerial and organisational improvements.	Accepted
	PL2: External learning and consultation plays a positive role in successful public service innovations.	Partly accepted
	PL3: Innovation-related learning in public sector services is cumulative and can result equally from previous positive and negative experiences, internally and externally.	Accepted
TECHNOLOGY	PT1: Technological knowledge is the major element improved internally and obtained externally in the development process of public service innovations.	Accepted
	PT2: The role of technology in today's public sector is integrated with other managerial processes; the time when technology was considered something separate and different is over.	Partly accepted
	PT3: Classical 'technology push' does not work in the public service innovation process.	Partly accepted
	PT4: Technological risk is among the most important external hampering factors in the public service innovation process.	Accepted
SYSTEMS	PS1: The innovation process in the public services is a systemic phenomenon and should therefore be analysed and managed within a broader perspective of the innovation system.	Accepted
	PS2: The nature of public service innovations depends on different determinants. PS2.1: The nature of public service innovations depends on the field they belong to. PS2.2: The nature of public service innovations depends on the type they are. PS2.3: The nature of public service innovations depends on the country they are from.	Partly rejected Rejected Rejected Accepted
	PS3: Public policy effects (in their wider sense) on technological innovation in public sector services are multi-factorial and weight differently depending on the activity. PS3.1: Innovation in public sector services requires changes in laws and regulations. PS3.2: Innovation in public sector services requires contribution from public policy (in its narrow sense).	Accepted Rejected Accepted
	PS4: The main characteristics and driving forces of the public service innovation system do not differ across different countries.	Rejected

Notes: (*) For theoretical and empirical arguments drawn from the literature see table 4.1. (**) The term 'neutral' is used in case data does not allow to take a clear position (e.g. there are equally pros and cons); term 'partly' is used in the case that data supports or hesitates the proposition, however there is an important conditionality ('yes, but' or 'no, but') to be aware of.

Chapter 6 answered *sub-research question SRQ1* while analysing the key features influencing, supporting and hampering, the development and implementation of successful, technologically innovative public sector services. In general, supporting factors were rated much more important than the hampering factors (both internally and externally), and internal factors (supporting + hampering) were less important, but still statistically significantly out-performed the importance of external factors (supporting + hampering). According to importance, across countries, the three most important factors were accordingly the following (see also sub-chapter 6.5):

- Internal supporting: personal leadership or existence of 'key' individuals[41], top management commitment and support, and open-minded managers;
- Internal hampering: the lack of knowledge about existing technologies, weak cooperation with technology suppliers, and weak top management commitment and support;
- External supporting: good cooperation with partners (intermediates and technology providers), user demand, and user trust;
- External hampering: lack of finances, high technological risk, and absence of relevant good examples.

Based on the research result, we should accept proposition PM1 stating that factors (including goals) influencing the innovation process in public sector services differ to some extent from the ones we know from the private sector. Competitiveness[42] and service cost, which are important innovation drivers in the private sector, were both among the least important innovation goals rated by the respondents, see figure 6.1. Moreover, competitiveness, as well as budgetary pressure, is one of the least important external innovation supporting factors in public sector services (indeed, as a direct hampering factor, lack of finance is seen as one of the most important). This is contrary to Borins (see 2001c and chapter 3) who concluded from his research that a common denominator of all the characteristics of public sector innovation is that they look very much like the private sector. Indeed, Borins (2001b) was right in supporting the idea that innovation supporters in public sector organisations are always multi-factorial. In their case study research, Vigoda-Gadot *et al.* (2005) received mixed results on this issue, where the majority of interviewees reported differences between innovation in the public and in the private sectors (see also chapter 3). During these interviews the authors of the same study also found was that the public sector is less willing to take risk than the

[41] The prominent position of personal leadership might be slightly biased as mostly persons who were responsible or linked to the particular public service innovation development filled in the questionnaires.
[42] Competition means the presence of alternative service providers, both in the public (e.g. other hospital, school or library) as well as private sector (e.g. commercial banks in providing personal identification services).

private sector (see Koch and Hauknes, 2005). The results proved the views of Røste and Miles (2005), who argue that differences between private and public sector innovation are less distinct and more nuanced than simplistic views would imply.

Willcocks and Harrow (1992; sub-chapter 2.2) stress that there is a reason to believe that possible goals in the public sector services are much more polar ones compared to the private sector. The research gave mixed results regarding this point. Therefore, we remain neutral in terms of proposition PM2 that innovation goals in the public sector are equally polarised. Although the responding organisations had many different innovation goals, cumulatively, the major ones are clearly drawn out: improvements in service quality, going online, responding user needs, and improving the take-up of the service (see figure 6.1). Howells and Tether (2004; sub-chapter 4.1) discovered a similar dominant position of quality issues in relation to the aim of innovation in their private sector services' analysis. In contrast, Grout *et al.* (2003; sub-chapter 2.2) have stressed the typical concerns is that publicly controlled organisations, not subject to the discipline of the competitive market, may therefore lack incentives to control costs or provide quality of service and respond to the needs of consumers. In our research, we see quality issues falling behind if look at the most important innovation goal by country: in Estonia it was to reduce the time spent on service delivery, in Finland and the UK to go online, and in Denmark to improve transparency.

We have rejected proposition PM3 that innovation goals in the public sector are technically achieved (i.e. technologically innovative service exists), but the ways in which they are successful fall below the initial expectations (rated as average or poor). Most of the organisations in the survey measured the success of their innovations (only 14 per cent do not, see table 6.14). Compared to the initial expectations, 30 per cent rated their innovation results as excellent and 60 per cent as good, meaning that 90 per cent of respondents consider their innovations as successes. This relatively good evaluation is partly due to the fact that it was best practice research by its nature, partly because it is hard (and maybe not possible) to find any (common) quantitative measures to measure the innovation success in the public sector (compared to the private sector where return on investment, sales or productivity measures can be used). The UK has the most and Estonia the least optimistic organisations in terms of evaluating their public service innovation results. The latter is interesting, because typically the larger the development, the more likely it is that it will be unsuccessful (Goldfinch, 2007), however, the

largest country (the UK) in our survey was most optimistic about the results. Although it was a best practice research, our results contradict literature statements that most governments experience problems when implementing large technology, mostly information technology projects. Budgets are exceeded, deadlines are over-run and often the quality of new systems is far below the standards agreed when the project was undertaken (see sub-chapter 4.3; Standish Group International, 1995, 1996; Borins, 2001b).

Contrary to what literature assumes, we reject proposition PM4, stating that innovation supporters in the public sector can be equally internal to the organisation and external, or as Borins (2001b) simply puts innovation supporters are always multi-factorial. Internal supporting factors were statistically significantly more important than the external ones, i.e. organisational issues are more important when the external influence in boosting the innovation process. According to Borins, while he asked the respondents what was innovation in their programme, the most frequent characteristic, observed in approximately 60 per cent of programmes, was 'holism', namely that the innovation depended on inter-organisation cooperation, that it delivered multiple services to individuals, or that it took a systems approach to a problem. In Contrast, our results support the views of Vigoda-Gadot *et al.* (2005), who found that all of the participants could be initiators of innovation in the public sector; however, internal actors like managers and frontline employees are the primary initiators of innovation. These are followed by employees, other organisational personnel and only then by professionals, government and politicians, end-users and external organisations.

In terms of hampering factors, it was opposite (with smaller differences only); internal barriers were statistically significantly less important than the external ones, rejecting both proposition PM5 that innovation barriers in the public sector are predominantly internal to the organisation, as well as the views of Vigoda-Gadot *et al.* (2005), who found that barriers to innovation in the public sector are mostly internal. Their findings showed that interviewees perceive barriers to innovation as deriving from public service's leadership and management (i.e. budget cuts or poor allocation of budget funds, and poor leadership). Indeed, our research results support the private services experiences, where, the external conditioning factors are more significant barriers than internal ones to firm innovation (Howells and Tether, 2004).

Across countries, the result support proposition PM6 that personal leadership (i.e. existence of 'key' individuals) is the internally dominating factor supporting innovation in public sector services, followed by top management commitment and support, and open-minded managers. These results support the basic statements of the literature emphasising the importance of innovation champions (see Drucker, 1985; Rothwell, 1992, Tidd *et al.*, 2001, Koch and Hauknes, 2005), however, we have to acknowledge that mostly project leaders themselves filled in questionnaires in our survey. Indeed, the UK showed different results, where a supportive organisational structure, top management commitment and support, and close cooperation with technology suppliers were more important. Therefore, we suggested to extend the 'key' individuals definition in the public sector according to the Troika-model of innovation promotors (see Hauschildt and Kirchmann, 2001), where three layers of promotors are differentiated: power promotor (at the top), process promotor (in the middle) and technical promotor at the expert or innovator level. Finally, as Altshuler (1997) stresses, people in government fear nothing more than newsworthy failure, therefore it has been rightly put by Teofilovic (2002) that strong leadership is a necessary imperative for establishing a cohesive, yet flexible, workplace culture that encourages idea experimentation and tolerates 'smart failures'.

Similar results were also achieved after principal component factor analysis, where operational management (isf3; referring to open-minded managers, personal leadership or committed 'key' individuals, available mandate, motivation and tools of the project manager, existence of ideas, and previous negative experiences/failures) was seen statistically significantly the most important internal supporting factor, while top management (isf1) the least important internal supporting factor. The importance of structure and organisational culture (isf2) and external cooperation (isf4) were positioned in the middle of these two component factors. The relative differences between new statistical factors within the internal hampering factor question were smaller, with structure and organisational culture (isf2), as well as external cooperation (isf4) slightly more important than top management (isf1) and operational management (isf3), see chapter 7 for details.

The analyses in sub-chapter 5.3 focused on answering *sub-research question SRQ2* – which managerial and organisational improvements are necessary to innovate in public sector services? Our empirical findings support the literature that the cumulative accumulation of knowledge and skills is crucial for the innovation process. The research showed that innovation-related organisational learning is multi-

factorial and technological innovation in the public sector services requires a broad range of managerial and organisational improvements, therefore we accepted the respective proposition PL1. Organisations in the survey improved several intra-organisational capabilities in order to innovate (e.g. technological knowledge 69 per cent, project management skills 64 per cent, general management skills 34 per cent, organisational structure 28 per cent, motivation system of personnel 15 per cent). Only 6 per cent reported not having any internal capability improvements to innovate. The importance of internally improved capabilities was similar across all countries in the survey and our conclusions were in line with the views of Røste (2005), who states that the cumulative accumulation of knowledge and skills, i.e. the whole learning process, is crucial for innovation in the public sector.

Literature generally supports the proposition that external learning and consultation plays a positive role in successful public service innovations (PL2), stressing that not all the new ideas are generated inside the focal organisation; some are generated externally but are adopted by the organisation (see for example Damanpour and Gopalakrishnan, 1998). However, this research showed that it could be only partly accepted. Organisations in the survey did obtain external capabilities in order to innovate. However, the capabilities were too much towards one type of knowledge – namely 81 per cent of them obtained external technological advice/support. Other improved factors were too minor for fully accepting the proposition (e.g. 21 per cent for project management skills, 11 per cent managerial advice and support, 5 per cent HMR advice/support). External technological advice and support was highly used in all countries (from 76 per cent in Denmark to 87 per cent in the UK). The fact that external learning is heavily skewed towards technological knowledge indicates that learning is not a systemic process in our survey sample, meaning that innovators' fundamental learning processes, also called absorptive capacity (see Cohen and Levinthal, 1989 and sub-chapter 3.3), are indeed weak. For example, their ability to systematically identify, assimilate, and exploit different types of knowledge from the environment. According to Lane *et al.* (2006), in the private sector, developing and maintaining absorptive capacity is critical to a firm's long-term survival and success because absorptive capacity can reinforce, complement, or refocus the firm's overall knowledge base. Fundamentally, a key determinant of relative success or failure is the ability to manage the learning cycle in explicit form (Hale, 1996; Bowen, 1994; Hayes *et al.*, 1988; Maidique *et al.*, 1985). In addition, not all external knowledge may be easily used and transformed into new artefacts (Winter, 1984), therefore internal dynamic capabilities (Teece *et al.*, 1997) should be continuously developed to

raise an organisation's ability of knowledge transformation. Finally, modern private sector literature also stresses the more advanced knowledge sharing mode, that is, besides acquiring external knowledge, many firms have also begun to actively commercialise technology, for example, by means of out-licensing. This increase in inward and outward technology transactions reflects the new paradigm of open innovation (see Lichtenthaler and Ernst, 2009; chapter 2.3), which in the public sector can be also called mutual policy learning across countries and regions.

From another learning angle, our research result proved that innovation-related learning in public sector services can result equally from the previous positive and negative experience, internally and externally (PL3). This supports also the views of Bloch (2010), who states that the willingness to take on risk and the ability to learn from failures are important issues for public sector innovation. Overall, 53 per cent of responding organisations had previous positive experience with similar innovations; only 11 per cent of the respondents reported having previous negative experience. As much as 45 per cent of the responding organisations had no previous experience, positive or negative, with similar innovations. This was highest in Estonia – 54 per cent, and lowest in Denmark – 35 per cent. Previous positive experience was most encountered in Denmark (65 per cent) and least in Estonia (46 per cent). Negative experience was most often faced in Finland (20 per cent) and least in Denmark (6 per cent). Only 19 per cent of the responding organisations did not learn from the previous experience (while 45 per cent had no appropriate experience in-house). All experiences, internal and external, positive and negative, were used. This shows that at least to some extent, public sector innovators are learning organisations. To some extent this might be the result of the growing wave of policy-learning during last few decades, however Bason (2010) is very radical about this, stating that many public sector organisations are still essentially navigation blind when it comes to real-time, relevant management information on performance and applying past experiences and best practices available.

The research also showed that learning from the previous positive experience seemingly dominates any learning from the previous negative experience. Moreover, organisations are slightly more likely to learn from others than from their own previous experience: 43 per cent for the former and 39 per cent for the latter in terms of positive experience, 23 per cent and 21 per cent respectively from previous negative experience. When comparing different countries, then organisations from the UK and Denmark most often learned from their own positive experience, while in Finland and Estonia

organisations were more open to positive experience of others; and similarly for learning from negative experience. The external focus of learning discovered, supports the views of Koch and Haukens (2005), who claim that in order to learn and innovate, the actors in the public sector must interact with other actors, this being people, organisations or various sources of information (see sub-chapter 4.4). Interestingly, negative previous experiences did not also exist (or had not been reviewed) by most of the respondents while developing innovations of our sample. Therefore, even if every innovation is different from another, one might still expect and we suggest that service providers in the public sector would put more emphasis on learning from mistakes and failures. This is especially appropriate in the case of large technology projects, which, according to the literature, fail or are over-budget and over-deadline every now and then (see sub-chapter 4.3), and, according to Goldfinch (2007), the larger the development, the more likely it is that it will be unsuccessful.

The *sub-research question SRQ3* examines the importance of technological knowledge in the public service innovation process, asking what is the importance of technological knowledge in the public service innovation process, where and how is it developed? The empirical findings support the literature that technological knowledge is one of the more complicated forms of knowledge, which is not so simply distributable and understandable (without specific engineering skills), as the study-results support the proposition (PT1) that technological knowledge is the major element improved internally and obtained externally in the development process of public service innovations. Although there were some differences between countries, whether technological knowledge or project management skills were the most important internally improved the capability for innovation. Overall, the results are showing that the most important intra-organisational capability improved by the innovating organisations was technological knowledge (69 per cent of respondents). Technological advice and support, moreover, was the single most important externally obtained capability for innovation (81 per cent of respondents).

The results also show that the role of technology in today's public sector is becoming integrated with other managerial processes (PT2), indeed, being still a strong determinant for subsequent innovation, as stated by Koch and Haukens (2005; see chapter 3). Therefore, we only partly accept the proposition PT2. Looking at the supporting and hampering factors (internal and external) of innovation, we clearly see that different technological issues, such as good knowledge of existing technologies, close

cooperation with technology providers, technological risk, existence of good examples, technology push (lobbying by technology providers) and digital divide are intertwined with managerial, political, legal, personal (personnel), and other issues. This is supported also by Heeks (2001) in terms of e-government services, there seven dimensions are necessary and sufficient to provide the understanding of e-government design-reality gaps: (1) information, (2) technology, (3) processes, (4) objectives and values, (5) staffing and skills, (6) management structures and skills, (7) other resources: time and money. Indeed, in our research, from the external learning perspective, technology was still the central topic. In addition, the largest challenge today is that innovations in government are ad hoc initiatives and mostly linked to a particular technology, key leader, organisation or narrow service. Therefore, mutual and continued organisational and technological upgrading of governance and service systems is needed to successfully face today's challenges.

We know from the literature (e.g. Tiits and Rebane, 2009), that successful technological innovations depend on many interrelated aspects. The results of this research showed also some evidence, that classical 'technology push' (which we mainly know from early private sector innovation literature) does not work in the case of public service innovations (PT3). Although external cooperation does not automatically mean technology push, the study results showed that only 8 per cent of service-innovations in the public sector are fully developed externally; 24 per cent are developed only internally; and as much as 69 per cent are developed in cooperation of the organisation and its external partners. This means that the active or passive lobby of technology developers and/or providers is not too strong in the case of public service organisations, at least comparing it to the alternatives, market-pull or demand-pull (see Martin, 1994). Also, even if technology push was defined more openly than the traditionally industrial innovation literature does (see Godin, 2005; sub-chapter 4.1), it was rated as the fourth least important external innovation supporting factor, together with low technological risk, and after competition and budgetary pressure. The low importance of such activity might be linked to the fact that technological innovations in the public sector are usually unique (tailor-made), i.e. it would be hard to use an existing/standard solution for their development (although we sometimes see it, for example in the case of educational technologies). However, the fact that as much as 81 per cent of innovators obtained external technological advice and support, indeed, tend to question proposition PT3 that classical 'technology push' does not work in the public service innovation process. Therefore,

we only partly accept the proposition. To paraphrase Nathan Rosenberg (1994: 139), "Everyone knows that the linear model of innovation is dead", however in the public sector, only partly.

The literature considers technological knowledge one of the more complex types of knowledge and that innovation is related to risk-taking and uncertainty, which politicians typically avoid, as stated by some authors. Failure explanations of public sector technology projects typically include data inadequacies, technical problems, management/process/technical skill shortages, cultural clashes, political infighting and external environmental factors (see Heeks, 1999). Therefore, we also saw in our literature review that authors are tackling innovation from the risks and obstacles perspectives in the public sector quite extensively (e.g. Bhatta, 2003; Kubr, 1988). It is stressed that while citizens demand a modernised government, they are generally ambivalent about innovation in the public sector, particularly because innovation often involves risk-taking that can lead to significant monetary losses (see Teofilovic, 2002; sub-chapter 2.1). Our research supported this proposition (PT4) that technological risk is among the most important external hampering factors in the public service innovation process. It was the second most important external hampering factor, after lack of finances, followed by the absence of relevant good examples, high political/reputation risk, weak cooperation with partners and digital divide. Moreover, as an innovation supportive factor (figure 6.6), low technological risk was the third least important factor externally. The thoughts of Vigoda-Gadot *et al.* (2005) also support the proposition, saying that as technology innovation is often driven by suppliers (vehicles, devices, telecommunications), this might lead towards larger technological risks. Indeed, public health systems studied in the same Publin project (see Koch and Haukens, 2005) appear to share a number of common features which could act in a way to hinder or prevent the process of innovation.

The last *sub-research question SRQ4* asks, what does the composition and dynamics of public sector (service) innovation system look like across countries? Relying on the results of our exploratory research, sub-chapters 8.1 and 8.2 illustrated the overall dynamics of the configuration of public service innovation systems, as well as country-specific characteristics of innovation systems (see also figures 8.1-8.5). The results were presented within the proposed theoretical framework developed in chapter 3. Data was presented in original factors (results of chapter 5; in the case of learning environment) as well as in new statistical factors developed in chapter 6 using principal component factor analysis (in the case of organisational factors, goals and results of innovation, and external environment). More

detailed results can be found in chapters 5 and 7. In this section, we look at the systems related research propositions developed in chapter 4 (see figures 4.1 and 8.1).

Firstly, both the theoretical foundations and our research results support proposition PS1 that the innovation process in the public services is a systemic phenomenon and should therefore be analysed and managed within a broader perspective of the innovation system. There is a general consensus among researchers that innovation takes place in a system consisting of individuals, firms and institutions, and within a certain cultural and regulatory framework (see Carlsson and Stankiewicz, 1993; Freeman, 1987; Goldsmith and Eggers, 2004; Edquist, 1997b; Enzing and Kern, 1999; Lundvall, 1992; Malerba, 2002a, b, c; Nelson and Rosenberg, 1993; OECD, 1997). According to Røste (2005), innovation in the public sector is systemic (Koch *et al.*, 2005 calls these systems 'innovation networks'). We call this context the 'public service innovation system', including the organisational environment, learning environment and external environment. The tendency towards external cooperation in innovation development shows us that the public service innovation process happens within the broader innovation system framework. From the provision perspective, less than half of the innovative services were provided directly by public entities, followed by public and private entities in cooperation. This growing cooperation necessity is also supported by Borins (2001b), whose study discovered that the innovation depended mostly on inter-organisation cooperation, that it delivered multiple services to individuals, or that it took a systems approach to a problem (see chapter 3). However, the system advantages are not fully utilised as innovations appear chaotically in public sector services and are mostly institution, key leader or service-centric. Therefore, without understanding and properly managing this dynamic innovation system, innovation remains an ad hoc process in public administration (which it also tends to be in at least half of the best practice cases organisations of this research). To make innovativeness a reality, both governments and public organisations should have a long-term strategy in which innovation plays a key role. Continued innovation, knowledgeable risk-taking and wise piloting should be systematically integrated into all levels of administration, management and citizen service. It is also important that (service) innovations take place across organisational borders and areas of governance, resulting not just in more technology-intense services, but also in new business/governance models. Continuously raising budgetary pressure in most of the European countries requires them to innovate not just with their services, but with broader welfare and governance models, which is a much more challenging job to do.

Following the research results, proposition PS2 stating that the nature of public service innovations depends on different determinants, can be only partly accepted. From a country perspective, our research results (chapter 7) show that there are many statistically significant differences across countries and we therefore accept sub-proposition PS2.3 that the nature of public service innovations depends on the country they are from. These results contradict most of the comparative work on cultures (see Didero *et al.*, 2008), which are based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states. However, our empirical evidence shows that there are very few statistically significant differences if comparing innovation goals, internal and external innovation supporting as well as hampering factors by the field of innovation. Therefore, we rejected sub-proposition PS2.1 that the nature of public service innovations depends on the field they belong to. This contradicts what is known from the practice of private sector innovation research, that there might be several factors, for example industrial field and organisational structure, which determine the innovation intensity and success of firms.[43] We also rejected the literature driven sub-proposition PS2.2 stating that the nature of public service innovations depends on the type they are. Sub-chapter 7.6 focused on innovation-type specific determinants, where, among other things, we carried out univariate (ANOVA) analyses to test the statistical significance in differences between public service innovation types on the importance of new statistical factors supporting or hampering innovation (internally and externally). However, in terms of basic or advanced innovation goals and results, different internal and external innovation supporting and hampering factors, the univariate analysis did not show any statistically significant differences between different innovation types (see also annex 14 for details).

Despite our results, fields and types of innovation in the public sector can be defined differently, depending on the nature of the study, and these might give different results in terms of statistical significance of a particular determinant. We gave an example before from the innovation capacity study of voluntary and non-profit organisations (VNPOs) in the UK (see Osborne, 1996, 1998; Osborne and Flynn, 1997), where the authors found that for those VNPOs which were engaged in innovative

[43] For example, Tidd *et al.* (2001) concluded from the existing private sector knowledge base, that there are no easy answers about successful innovation management and that innovation varies enormously – by scale, type, sector, etc. Howells and Tether (2004; sub-chapter 4.1) also discovered significant sectoral differences within services in terms of the activities in their private sector services' research.

activity, it is related to the type of innovation that they are pursuing and its management implications (see chapter 3). Also, when the National Audit Office in the UK inspected government innovations in 2006, they found in particular that central government organisations needed to improve their understanding about where the potential for innovation lies, increase the incentives for individuals to innovate, strengthen their ability to learn from one another and improve the pace at which innovations are implemented (see National Audit Office, 2009). Koch *et al.* (2005) also give an example that if one country decides to provide care for elderly through publicly owned organisations, another through private and yet another through a mix of both types, then these should all be included when saying something useful about innovation in the public sector, when a functional perspective is chosen. These different experiences confirm that different determinants can have a different impact on public sector innovativeness.

Research proposition PS3 stated that public policy effects (in their wider sense) on technological innovation in public sector services are multi-factorial and weight differently depending on the activity. The proposition was driven from the fact that public institutions operate under certain regulatory, social and political rules, legacy and heritage – all of them factors that might influence the innovation paradigm in the public sector. In one extreme, of course, public sector organisations might enjoy relatively large freedom in their activities, like few exploratory state development units do, e.g. NESTA in the UK, SITRA in Finland or the Estonian Development Fund. However, it is much more common that many public sector innovations may simply be dictated either directly or indirectly from external sources like policy changes, regulations, etc. (see Bloch, 2010). Among the long list of innovation drivers, the National Audit Office (2006) lists also the importance of new government priorities, response to crisis, change in ministerial priorities, change in policy environment, changes in resource use, implementing EU policies, etc. Furthermore, as the issues faced by public authorities are often complex, according to Thenint (2010), the wrong policy mix might also have adverse effects on overall government performance.

Our research results showed that contrary to initial expectations, only 21 per cent of innovations required changes in laws and regulations (table 6.16). The ‘legal barrier’ was larger in Estonia (40 per cent of innovations required legal or regulatory changes) and smaller in the UK and Finland (where respectively 7 per cent and 10 per cent of innovations required such changes). Legal and regulatory

barriers were also evaluated as non-important in the questions on external factors supporting innovation (figure 6.6) and external factors hampering innovation (figure 6.8), discussed in sub-chapter 6.5. Therefore, we rejected sub-proposition PS3.1 that innovation in the public sector requires changes in laws and regulations. Indeed, conversely the majority of organisations (65 per cent) reported the impact of public policy (in its narrow sense; laws and regulations excluded) on their innovations (table 6.17), being most influential in the UK (80 per cent of respondents), followed by Finland (65 per cent), Estonia (50 per cent) and Denmark (39 per cent). The importance of public policy contributions also emerges from the question on external factors supporting innovation, where it was the fourth most important (figure 6.6). These findings support sub-proposition PS3.2, claiming that innovation in the public sector requires contribution from public policy. These two sub-propositions together show that policies (in their narrow sense), and laws and regulations have a different impact on technological innovations in public sector services, where policies are much more important. Therefore, we accepted the overall proposition PS3 that public policy effects (in their wider sense) on technological innovation in public sector services are multi-factorial and weight differently depending on the activity. Indeed, one should be careful in underestimating the role of laws and regulations; our research was a best practice research and non-existing cases might non-exist exactly because of disruptive legal and regulatory environment. This is definitely the case when we talk about larger infrastructural innovations (such as ID cards, cross-use of different databases, etc.). Therefore, the fundamental aim is to maximise the chances that the regulatory framework will support innovation objectives, rather than running the risk of impeding or undermining them. On the other hand, the situation where public policies have a considerable effect on public service innovations supports the broad idea of the so-called third generation innovation policy (see European Commission, 2003, as well as related theoretical discussion in chapters 2). However, even if the idea of the third generation innovation policy was to put innovation at the heart of each policy area, it was more targeted to private sector oriented policies (i.e. enterprise policy, industrial policy, technology, science and innovation policy, regional policy, educational policies, agricultural policy, etc). Our empirically led suggestion here is that innovation should also be put at the heart of any public or administrative policy or framework. Indeed, this should be done in a careful manner as the public sector is generally risk averse and cannot fail altogether, as some business projects might, and are sometimes even expected to do.

The final proposition PS4 related to systems framework, proposes that the main characteristics and driving forces of the public service innovation system do not differ across different countries. It was driven from views that innovation culture is to be understood in terms of attitudes towards innovation, technology, exchange of knowledge, entrepreneurial activities, business, uncertainty (Hofstede, 2001), and related behaviour and historical trajectories. On the other hand, we have the understanding that most comparative work on cultures is based on the assumption that there is a large degree of homogeneity within nation states as opposed to large differences between nation states (Didero *et al.*, 2008).

The evidence from chapters 6 and 7 reject the proposition that the main characteristics and driving forces of the public service innovation system do not differ across different countries (PS4). Compared to the innovation field and innovation type, country is the strongest determinant (in terms of statistically significant differences). Indeed, the survey has shown that from the external factors perspective, public service innovation systems look relatively similar across countries. The variations are much larger within the organisations as well as in their learning environments and innovation goals.

More advanced innovation goals were set in Estonia and the UK, while in Denmark the basic goals were seen as more important, and in Finland advanced and basic goals had equal importance. There are larger country differences in innovation hampering factors than in case of innovation supporting factors (however, innovation supporters overall are rated as more important than hampering factors). For example, public sector organisations in the UK see relatively more hampering factors while innovating than organisations in other countries, especially in Finland. This might be due to the size differences between the UK and other countries, which pushes up the project sizes and cost, and therefore the risks linked to them. Weaknesses in operational management are seen as a relatively weak innovation-hampering factor especially in Finland and Denmark. External cooperation conversely is seen as a relatively more important innovation hampering factor (compared to other factors).

From the external supporting factors' perspective, in all four countries users were the most important external factor supporting innovation and finances the most important external innovation hampering factor. In absolute terms, lack of finances was the most important external restriction in the UK, followed by Estonia and Denmark. Users and partners were statistically significantly less important innovation external hampering factors in Finland then in other three countries.

There are many other issues which are unique to a particular country public service innovation system, as we saw in sections 8.1 and 8.2 of this chapter. For example, the larger country size of the UK leads presumably to a larger and more complicated institutional setup, which makes the innovation process more costly, and therefore riskier, as the survey showed. The survey also showed that risks are mitigated and confidence gained in the UK through the political demand and commitment to long-term major projects, strong top management commitment and support, close cooperation with technology suppliers and future users, as well as just through better market (demand) knowledge, which all are relatively more important in the UK than in other countries. The UK public service organisations also used most intensively external technological advice and support while innovating (87 per cent).

Factors such as top management and organisational structure and culture were relatively less important internal innovation supporters in Denmark than in other countries. Moreover, together with Finland, public service organisations in Denmark saw top management as an important innovation hampering factor, in contrast to the UK and Estonia. Indeed, internal supporting factors, such as supportive organisational strategy and innovation accepting organisational culture tend to be more important in Finland than in other countries. Finnish public service organisations have also the highest rate of internal negative experiences with similar innovations – 20 per cent. At the same time, together with the UK, Finns are the most active learners from previous experiences, mostly from positive experiences outside the organisation (55 per cent) and inside the organisation (45 per cent).

External factors, such as supportive policies, appropriate laws and regulations, competition, and technology push, are relatively more important in Estonia than in other countries. From another perspective, no or weak political demand, no political commitment to long-term major projects, inappropriate laws and regulations, lack of financial resources, lack of trust and digital divide are relatively more important external hampering factors in Estonia compared to other countries.

The relative advancement of the Estonian public service innovation process can be explained by the small size of the country, as projects are smaller and, therefore, less risky to carry out. Also, relatively smaller national wealth (i.e. resources available) together with the advanced infrastructure (telecommunication, electronic banking, ID card, digital signature, etc.) motivates producing creative technological solutions to traditional problems. A relatively young socio-economic structure might also

be less reluctant to new ideas compared to the countries with long traditions and historical habits of doing things.

Finally, the dynamics of the innovation processes discovered in this exploratory research opposes the proposition PS4, stating that the main characteristics and driving forces of the public service innovation system do not differ across different countries.

Overall, the uniqueness of this exploratory research is that it empirically showed the relative importance of different factors influencing the innovation process in public sector services. Moreover, attempts were made to show how these factors determine the possible nature of public service innovation systems in four European countries – the UK, Denmark, Finland and Estonia. The author believes that this exploratory thesis stepped a little closer towards a systemic approach to understanding and managing innovation in the public sector.

9. CONCLUSIONS

> *"The true measure of the State is not its "size", but rather the nature of the functions that it performs, and the efficiency and effectiveness with which it performs them."* World Public Sector Report: Globalization and the State, 2001

The aim of this thesis was to facilitate the way towards a systemic approach to understand and manage innovation in public sector services. Using exploratory methodology and unique combination of literature streams, the research brought out the main characteristics, driving forces and differences of public service innovation systems in four countries – the UK, Denmark, Finland and Estonia. The research had four perspectives in which the public sector innovation process was analysed: managerial, learning, technological, and systems perspective. This final chapter comprises a summary of the key conclusions, the main contributions to different streams of literature, methodology, and implications for policy and public sector management. It is followed by the boundaries and possible generalisations of the current research and outstanding questions for further research.

9.1. Summary of the key findings - interpretation

The contribution of new knowledge of the present dissertation is four-fold. Firstly, the purposely-developed theoretical framework that gives a structured approach how to understand and manage innovation in public sector services. Secondly, the new conceptual-methodological approach of how to study and analyse the innovation process in public service organisations. Thirdly, the hand-made list of public service innovations from four countries and the database of the survey results. Fourthly, the quantitative analysis and synthesis of the survey results which characterises the innovation process of public service organisations in the survey countries. Especial value of the research is that it allows understanding the relative importance of different factors (in comparison to other factors) influencing the innovation process in public sector services and shows the dynamics of the public sector innovation system. Research results contribute to the literature of public sector innovation and management and enriching academic debates around this increasingly important topic. Moreover, the research also analyses the differences of public and private sector innovation as well as innovation-related organisational learning issues, contributing both to theories of evolutionary economics and innovation.

Additionally, contributions can also be drawn for economic theory, organisational theory, public administration and political science.

The research question and theoretical framework developed in the first part of the thesis argue that innovation in public sector services is a systemic phenomenon, and therefore, it should be analysed as well as managed within the broader context. This context, which could be labelled 'public service innovation system', includes the organisational environment, learning environment and external environment. The systemic dynamics in which innovation happens in public sector services was the centre of the analysis. A number of different methods were used to provide insights into the nature of the successful innovation projects in the public sector.

The theoretical and conceptual part of the thesis started with the analyses of the literature focusing on key debates on the characteristics of innovation process in public sector services (chapter 2). This literature review chapter originated with the analysis of the evolution of innovation in the public sector and respective contemporary challenges; it then drew up the main differences between the public and private sector innovation, as well as analysed other modernisation and transformation waves, typologies, characteristics and trends of innovation in the public sector. The next chapter (chapter 3) concentrated on the empirical background and discussed the measurement of innovative activities in the public sector in previous empirical research. The fourth chapter defined conceptual framework for analysing the innovation process in public sector services and opened up four respective streams of literature related to that framework. Chapter five brought out and summarised the methodological procedures used in the following exploratory empirical research.

The empirical analysis of the research were based on the sample of 135 concrete cases of technologically innovative public sector services in four countries – the UK, Denmark, Finland and Estonia. Both the sample and the questionnaire used were unique, developed especially for the present research by the author. An overall response rate of 60 per cent was achieved.

After the survey and related analysis, a fifty person international workshop "Innovation in the Public Sector" was arranged in Estonia, where among other perspectives, the present survey results were discussed (see Estonian Development Fund, 2008).

In the empirical chapters of the present research, several different methods were used to analyse the dataset, to assess the relative importance of different factors influencing the innovation process and to draw out the dynamics and differences of the public service innovation systems in four countries under observation. For statistical methodology, descriptive statistics, principal component factor analysis and univariate (ANOVA) analysis were used. In chapters six and seven, a number of characteristics connected to the nature of innovations and their development, related knowledge-base, organisational and technological learning, innovation goals and results, drivers of innovation as well as barriers were analysed. This analysis was performed from three different layers of the public service innovation system: the organisation, its learning environment and the external environment. Merging the theoretical-conceptual framework (developed in chapters two, three and four) and the analysed survey data (chapters six and seven), chapter eight synthesised the empirical results of the study from the systems perspective, presenting overall and country-specific dynamic pictures of public service innovation systems, as well as other major research findings of the present research.

Hereafter we provide a short overview of the research findings (see also chapter 8). The main research question of the thesis was: "What is relative importance of different factors influencing the innovation process in public sector services and how do they determine the nature of public service innovation system in four European countries?" To conduct the analysis, a four layer conceptual framework was used: managerial perspective, learning perspective, technological perspective and systems perspective. These dimensions were associated with the four specific sub-research questions. All these questions also had respective propositions drawn out from the literature and accepted or rejected during the research (see also tables 5.1 for propositions and 8.1 for their acceptance).

In answering sub-research question SRQ1, we showed know that the most important internal factors supporting public sector innovation were personal leadership or the existence of 'key' individuals, followed by top management commitment and support, and open-minded managers. Most favourable internal hampering factors were the lack of knowledge about existing technologies, weak cooperation with technology suppliers, and weak top management commitment and support. Externally, the largest supporters were respectively good cooperation with partners (intermediates and technology providers), user demand, and user trust; indeed from the external barriers perspective: lack of finances, high technological risk, and absence of relevant good examples were seen as the most important.

Proposition PM1 was accepted as factors (including goals) influencing the innovation process in public sector services differ to some extent from the ones we know from the private sector. Competitiveness and service cost, which are important innovation drivers in the private sector, were both among the least important innovation goals rated by the respondents.

The research gave mixed results for proposition PM2 that innovation goals in the public sector are equally polarised. Although the responding organisations had many different innovation goals, cumulatively, the major ones are clearly drawn out: improvements in service quality, going online, responding to user needs, and improving the take-up of the service.

We rejected proposition PM3 that innovation goals in the public sector are technically achieved (i.e. technologically innovative service exists), but the ways in which they are successful fall below the initial expectations (rated as average or poor). Compared to the initial expectations, 30 per cent rated their innovation results as excellent and 60 per cent as good, meaning that as many as 90 per cent of respondents consider their innovations as successes (indeed, we have to admit that it was a best practice research, which might have an impact on this type of success questions).

We rejected proposition PM4, stating that innovation supporters in the public sector can be equally internal to the organisation and external. Internal supporting factors were statistically significantly more important than the external ones, i.e. organisational issues are more important when the external influence in boosting the innovation process.

In terms of hampering factors, it was the opposite (with smaller differences only); internal barriers were statistically significantly less important than the external ones, rejecting both proposition PM5 that innovation barriers in the public sector are predominantly internal to the organisation, as well as the views of Vigoda-Gadot *et al.* (2005), who found that barriers to innovation in the public sector are mostly internal.

Across countries, the result supported proposition PM6 that personal leadership (i.e. the existence of 'key' individuals) is the internally dominating factor supporting innovation in public sector services, followed by top management commitment and support, and open-minded managers. These results support the basic statements of the literature emphasising the importance of innovation champions (see

Drucker, 1985; Rothwell, 1992, Tidd *et al.*, 2001, Koch and Hauknes, 2005). However, we have to acknowledge that mostly project leaders themselves filled in the questionnaires in our survey, probably having a positive effect in favouring personal leadership issues.

In answering sub-research question SRQ2, which managerial and organisational improvements were necessary to innovate in public sector services, our empirical findings supported the literature that the cumulative accumulation of knowledge and skills is crucial for the innovation process. We accepted the respective proposition PL1; organisations in the survey improved several intra-organisational capabilities in order to innovate, e.g. technological knowledge 69 per cent, project management skills 64 per cent, general management skills 34 per cent, organisational structure 28 per cent, and motivation system of personnel 15 per cent. Only 6 per cent reported not having any internal capability improvements to innovate.

Research generally supported the proposition that external learning and consultation plays a positive role in successful public service innovations (PL2), stressing that not all the new ideas are generated inside the focal organisation; some are generated externally but are adopted by the organisation. However, our research showed that it could be only partly accepted. Organisations in the survey did obtain external capabilities in order to innovate. However, the capabilities were too much towards one type of knowledge – namely 81 per cent of them obtained external technological advice/support. Other improved factors were too minor for fully accepting the proposition (e.g. 21 per cent for project management skills; 11 per cent for managerial advice and support; 5 per cent for human resource management (HMR) advice or support).

From another learning angle, our research result proved that innovation-related learning in public sector services can result equally from the previous positive and negative experience, internally and externally (PL3). Overall, 53 per cent of responding organisations had previous positive experience with similar innovations; only 11 per cent of the respondents reported having previous negative experience. As much as 45 per cent of the responding organisations had no previous experience, positive or negative, with similar innovations. The research also showed that learning from the previous positive experience seemingly dominates any learning from the previous negative experience. Moreover, organisations are slightly more likely to learn from others than from their own previous experience: 43 per cent for the

former and 39 per cent for the latter in terms of positive experience, 23 per cent and 21 per cent respectively from previous negative experience.

Under sub-research question SRQ3, our study-results supported proposition PT1 that technological knowledge is the major element improved internally and obtained externally in the development process of public service innovations. The results showed that the most important intra-organisational capability improved by the innovating organisations was technological knowledge (69 per cent of respondents). Technological advice and support, moreover, was the single most important externally obtained capability for innovation (81 per cent of respondents). Even if the purpose of our research was not to study organisational success, the results are somewhat contrary to the experiences of Damanpour *et al.* (2009), who found that organisational success in the UK public service organisations does not follow a technological trajectory and depends on the adoption of both technological and non-technological innovations. Their analysis provided empirical evidence for this view and demonstrated that the co-adoption of service, technological process, and administrative process innovations influence organisational performance in public service organisations.

The results also show that the role of technology in today's public sector is becoming integrated with other managerial processes, indeed, being still a strong determinant for subsequent innovation as stated by Koch and Haukens (2005), therefore we only partly accept the respective proposition PT2 (stating that the role of technology in the today's public sector is integrated with other managerial processes; the time when technology was considered something separate and different is over). The research results showed also some evidence that classical 'technology push' (which we mainly know from early private sector innovation literature) does not work in the case of public service innovations. Although external cooperation does not automatically mean technology push, the study results showed that only 8 per cent of service innovations in the public sector are fully developed externally; 24 per cent are developed only internally; and as much as 69 per cent are developed in cooperation of the organisation and its external partners. This means that the active or passive lobby of technology developers and/or providers is not too strong in the case of public service organisations (at least, comparing it to the alternatives, market-pull or demand-pull (see Martin, 1994). However, the fact that as much as 81 per cent of innovators obtained external technological advice and support, indeed, tends to question proposition PT3 that classical 'technology push' does not work in public service innovation processes.

Therefore, we only partly accepted this proposition.

Our research supported proposition PT4 that technological risk is among the most important external hampering factors in public service innovation processes. It was the second most important external hampering factor, after lack of finances, followed by the absence of relevant good examples, high political/reputation risk, weak cooperation with partners and digital divide. Moreover, as an innovation supportive factor, low technological risk was the third least important factor externally.

Sub-research question SRQ4 asked what does the composition and dynamics of public sector (service) innovation system look like across countries. Both the theoretical foundations and our research results supported the respective proposition PS1 that the innovation process in the public services is a systemic phenomenon and should therefore be analysed and managed within a broader perspective of the innovation system. In our survey, the context of the 'public service innovation system' included the organisational environment, learning environment and external environment. The tendency towards external cooperation in innovation development showed us that the public service innovation process happens within the broader innovation system framework. From the provision perspective, less than half of the innovative services were provided directly by public entities, followed by public and private entities in cooperation. We also claimed that systems advantages are not fully utilised as innovations appear chaotically in public sector services and are mostly institution, key leader or service-centric. Therefore, without understanding and properly managing this dynamic innovation system, innovation remains an ad hoc process in public administration (which it also tends to be in at least half of the best practice case organisations of this research). To make innovativeness a reality, both governments and public organisations should have a long-term strategy in which innovation plays a key role. Continued innovation, knowledgeable risk-taking and wise piloting should be systematically integrated into all levels administration, management and citizen service. It is also important that (service) innovations take place across organisational borders and areas of governance, resulting not just in more technology-intense services, but also in new business/governance models. Continuously raising budgetary pressure in most of the European countries requires them to innovate not just with their services, but with broader welfare and governance models, which is much more challenging job to do.

Proposition PS2 stating that the nature of public service innovations depends on different determinants was only partly accepted. From a country perspective, our research results proved that there are many

statistically significant differences across countries and we therefore accepted sub-proposition PS2.3 that the nature of public service innovations depends on the country they are from. Indeed, our empirical evidence showed that there were very few statistically significant differences comparing innovation goals, internal and external innovation supporting as well as hampering factors by the field of innovation, rejecting the respective sub-proposition PS2.1. We also rejected the literature driven sub-proposition PS2.2 stating that the nature of public service innovations depends on the type they are; the univariate analysis of variance performed did not show any statistically significant differences between different innovation types.

Research proposition PS3, which stated that public policy effects (in their wider sense) on technological innovation in public sector services are multi-factorial and weight differently depending on the activity, was overall accepted. Indeed, our research results showed that contrary to initial expectations, only 21 per cent of innovations required changes in laws and regulations, rejecting the respective sub-proposition PS3.1 that innovation in the public sector requires changes in laws and regulations. Indeed, conversely the majority of organisations (65 per cent) reported the impact of public policy (in its narrow sense; laws and regulations excluded) on their innovations, being most influential in the UK (80 per cent of respondents), followed by Finland (65 per cent), Estonia (50 per cent) and Denmark (39 per cent). The importance of public policy contributions also emerges from the question on external factors supporting innovation, where it was the fourth most important. These findings supported sub-proposition PS3.2, claiming that innovation in the public sector requires contribution from public policy. These two sub-propositions together show that policies (in their narrow sense), and laws and regulations have a different impact on technological innovations in public sector services, where policies are much more important. Indeed, one should be careful in underestimating the role of laws and regulations; our research was a best practice research and non-existing cases might non-exist exactly because of a disruptive legal and regulatory environment.

Finally, proposition PS4 proposing that the main characteristics and driving forces of the public service innovation system do not differ across different countries was rejected. As said earlier, compared to the innovation field and innovation type, country was the strongest determinant (in terms of statistically significant differences). Indeed, the survey has shown that from the external factors perspective, public service innovation systems look relatively similar across countries. The variations are much larger

within the organisations as well as in their learning environments and innovation goals. For more detailed results, see the respective empirical chapters, or the synthesis chapter eight above.

9.2. Implications for the literature and the methodology

This experimental research relied on a unique combination of literature, supporting and framing a possible structure of the public service innovation system framework and the empirical survey of the thesis. The thesis has used the contributions from several streams of literature, including the relatively young and fragmented literature of innovation in the public sector, grounding partly on decades-long knowledge of innovation in the private sector, partly flourishing from modernisation and transformation waves of public bureaucracies. This was followed by the development of the public service innovation system concept with respective theoretical foundations from four different perspectives: managerial, learning, technological and systems perspective. From the methodological and empirical angle, the thesis has analysed the few existing empirical works on innovation in the public sector (some of them conducted after the original survey of the present research in 2005). The aim of this sub-chapter is to contribute to these streams of literature, what we have been discovering and learning during this research. An important chapter to follow in this respect is also the previous synthesis chapter (chapter eight).

This thesis contributes to innovation and organisational literature, to economic theory and organisational theory, as well as to public administration and political science. There are two important shortages of public service innovation research this thesis contributes the most in public sector/service innovation research as well as government modernisation literature. Firstly, it develops a theoretical framework (including the literature review) of how to understand and study innovation in the public sector, and it sets up a unique set of public service innovations cases from four different countries. Secondly, the exploratory research itself: the methodology, the survey, the database and the analysis. The theoretical and methodological shortages this thesis contributes to are emphasised by authors such as Osborne and Brown (2005) and Mulgan *et al.* (2008). The general understanding has been that there is a lack of good empirical evidence about innovation in public service organisations and of a solid framework by which to analyse it. Authors state that the case of innovative capacity of public organisations is under-researched and the literature is full of normative assertions and/or pejorative

arguments, but little empirical work. Mulgan *et al.* also stressed that they found no major datasets or long-term analyses, and few signs of interest from large foundations or academic research funding bodies on this topic. This thesis helps to overcome some of these theoretical, methodological and empirical shortages.

Indeed from the public sector angle, the research also contributes to wider innovation theory, which is not a formal and established theory as such, but an amalgam of various disciplines such as economics, management, organisational psychology, cognitive theory and systems theory (Røste, 2005). We have brought the public sector innovation perspective into historically private sector dominated evolutionary theories (Nelson and Winter, 1982; Nelson, 1987, 1995). The research showed that from the innovation perspective, the public sector differs to some extent from what we know from the private sector. On the one hand, the research has opened up a potential list of key arguments, assessing their relative importance, of why innovation in the public sector takes place overall. The research showed that competitiveness and service cost, which are typically important innovation drivers in the private sector, were both among the least important innovation goals rated by public sector innovators. Therefore, the common theoretical concerns are valid that publicly controlled organisations are not subject to the discipline of the competitive market; they may lack incentives to control costs or provide quality of service and respond to the needs of consumers (Grout *et al.*, 2003). In addition, they have a wide stakeholder base, and abstract and wide social values and goals such as safer streets, better public health and educational levels.

On the other hand and from the organisational theory, public administration and political science perspective, compared to the private sector, the innovation process in the public sector is hectic and not a routine process. While in the modern private sector, innovation, product and process design and R&D are often institutionalised (they are part of the strategy, organisations have R&D units, R&D/strategy board members, even Chief Innovation Officers (CIOs), etc.), in the public sector innovation mostly relies on certain key individuals who are enthusiastic, knowledgeable and often self motivated to execute a particular innovation project. The industrial innovation literature knows these people also as product champions (Schon, 1963) or technological gatekeepers (Allen, 1986). Public sector management and innovation literature talks more about public entrepreneurship (Kingdon, 1984; Osborne and Brown, 2005; Osborne and Gaebler, 1992; Polsby, 1984; Roberts and King, 1989; Schon,

1971; Teofilovic, 2002; van Mierlo, 1995). Radošević (2006), however, stresses that systematic aspects of public entrepreneurship as a policy challenge need deeper understanding. He suggests doing a series of case studies of entrepreneurial and systems of innovation functions aimed at developing empirically based taxonomies for the public sector. This research provided its contribution in this respect.

The research proved that innovation in the public sector is 'people centred', also supporting the views of Rubenstein *et al.*, (1976), according to whom organisations do not make development projects successful, but individuals do. Indeed, we have to acknowledge that persons directly related to the development and implementation of the surveyed innovation filled in the questionnaires, which might have slightly influenced the results towards the importance of such key individuals. However, the research also showed that across countries it is not enough to have only public entrepreneurs to execute successful innovation projects. Top management commitment and support, and open-minded managers followed personal leadership as an internally dominating factor supporting innovation in the survey. Based on this empirical evidence we suggested using 'the Troika-model of teamwork for innovation' [developed by Hauschildt and Kirchmann (2001) based on the original work of Witte (1973) and Chakrabarti and Hauschildt (1989)] to raise the number and success probability of public service innovations of a particular organisation. The model helps to integrate strategic project level functions with the managerial context, widening the perspective of the project manager as a 'process promotor' (also project champion, promotor by organisational know-how) and bringing in the roles of 'technology promotor' (also expert, inventor, promotor by technological know-how) and 'power promotor' (also sponsor, innovator, promotor by hierarchical power).

The research also contributed to the literature related to organisational learning (see Cohen and Levinthal, 1989; Cowan *et al.*, 2000; Dosi, 1997; Lundvall, 1992, 1993; Lundvall and Johnson, 1994; Metcalfe, 1998; Nelson, 1995; Teece *et al.*, 1997; Winter, 1984). The research proved that innovation-related learning in public sector services can result equally from the previous positive and negative experience, internally and externally (however, there are certain country differences, see discussion earlier). What is interesting here is that based on the empirical evidence, the dynamic capabilities (see Teece *et al*., 1997) as well as absorptive capacity (see Cohen and Levinthal, 1990 and Lane *et al.*, 2006) of innovating public service organisations are heavily (and perhaps too much) inclined to technological aspects (as elaborated earlier). This over-technocratic behaviour of public innovators

allows them to bring 'yesterday's ' routine services to the Internet; however, governments need much more in order to cope with twenty-first century problems. We know from the private sector that most innovation processes start within companies trying to solve certain problems (Røste, 2005), however in public services, as the present research showed, the largest innovation goal has been going online with a service to respond to the user needs.[44] Therefore, we suggest more out-of-the-box thinking and contextual problem definition while innovating in the public sector. Governments should develop internal capacities and external connections, partnerships, citizen linkages and learning environments in a way that brings them closer to fundamental problem designs and cross-functional, cross-organisational and cross-sectoral solutions. Using collective learning tools (such as foresight and scenarios, citizen panels and pilot projects, but also so-called design thinking) to reach deeper/get closer to the fundamental problems could be helpful in developing totally new governance, organisation and working models, systems and interfaces, or service products – be it in healthcare and prevention, social affairs, education, business development or public administration and state management itself.

We know from the literature that innovation in the private sector mostly takes place in a system consisting of individuals, firms and institutions, and within a certain cultural and regulatory framework (Carlsson and Stankiewicz, 1993; Freeman, 1987; Goldsmith and Eggers, 2004; Edquist, 1997b; Enzing and Kern, 1999; Lundvall, 1992; Malerba, 2002a, b, c; Nelson and Rosenberg, 1993; OECD, 1997). The empirical findings of this thesis help us to understand what the layout and the forces of public service innovation system look like, as well as to see how the latter differs across four different countries (see earlier discussions and chapter 8).

The public service innovation system seems to be a dynamic environment in which public service organisations innovate. The system consists of three layers: the external environment (mostly external forces), the learning environment (partnerships and possibilities) and the organisation (structure,

[44] The normative literature considers technology in government mainly related to e-government activities in a number of stages (Irani, 2006), see for example Gartner Group, 2000; Howard, 2001; Chandler *et al.*, 2002; Layne *et al*., 2001; United Nations DPEPA, 2002; Silcock, 2001; Rambøll, 2004; Capgemini, 2006; Windley, 2002; Atallah, 2001; OECD 2004a; UNO, 2003; UNPAN, 2006). These frameworks tend to have three to five stages, starting from simple online presence of an organisation (i.e. posting of basic information) up to seamless or fully integrated web presence of government services (i.e. integrated services, data sharing, common platforms).

culture, management and leadership). The more we want to reach a truly networked government (see Goldsmith *et al.*, 2004), the more seamless, integrated and effective the public service innovation system should be. According to Goldsmith, governing by network represents the synthesis of four large trends – combining the high level of public-private collaboration characteristics of third-party government with the robust network management capabilities of joined-up government, and then using technology to connect the network together and give citizens more choices in service delivery options. Therefore, we strongly suggest that any future public service or sector innovation study to be made should be done in a wider context to really understand the reasonability and effectiveness of certain type of innovations, developments, improvements, and modernisations in government. The experiences from the current research show that relatively innovative public service organisations do exist. However, their innovativeness tends to be ad hoc, not too systematic, and often relatively simple with questionable effects on larger structural changes. Generally speaking, today's governments are long away from being ready to really upgrade themselves – to rethink of how they lead, structure and manage their countries to respond twenty-first century challenges, furthermore, to take advantages of those. The technologies are there, but leaders and organisations not yet. This proves the validity of the statement of Bason (2010: 8) that "public leaders must find better ways to institutionalise innovation, setting up structures and processes and building the capacity that effectively embedded innovation as a core activity in the organisations they run."

9.3. Implications for policy makers and public service managers

As the world is changing and governments are more and more challenged, to understand how the public sector innovation happens, what is the environment and what are factors influencing it, becomes a crucial topic for future discussions among politicians, policy makers and public service managers. The empirical findings of this thesis can facilitate this discussion and be helpful in making governments more systematic in their innovation management. Until now, the topic of governments innovating has been under researched with little empirical work done in this field, and this research has given its contribution in this respect.

The research suggests that innovation in public services takes place in a system frame, which can be labelled the public service innovation system, consisting of the external environment, the learning

environment and the organisation (see also earlier discussions). Within these environments, there are different factors which influence the innovation process, both positively and negatively, within the organisation and externally. The evidence also shows that innovations in government tend to be ad hoc initiatives, which rely too much on certain key individuals who believe in them and are executing them. Innovations also tend to be too technocratic, i.e. instead of elaborating new cross-institutional and cross-functional governance models, public sector organisations are increasingly trying to put their offline services online. Compared to the private sector, the public sector lacks institutionalisation in their innovation activities. With some exemptions, it is hard to find any permanent innovation structures or teams in governmental institutions, dedicated to a continued review of challenges and responsible for quick, creative and effective responses. Therefore, even more than in the private sector, innovation in government needs high level leadership and encouragement, where the Chief Innovation Officer should be the Prime Minister. This is because governments lack common innovation motivators, such as competitiveness and competition in the private sector, and that bureaucratic and regulated structures are usually unwilling to change, moreover, often psychologically, financially or politically punished in case of failure. The previous sub-chapter suggested following the Troika model to make innovation processes more active and successful in the public sector. According to this, project managers should act as process promotors, who are supported and backed by technology promotors from the knowledge side and power promotors from the (top) management side.

If the existence and success of innovations in the public sector is relying so much on certain key individuals as the research shows, then there are two crucial questions governments should carefully address: firstly, where and how are these public entrepreneurs prepared (educated), and secondly, how to utilise them effectively once they are employed in the public sector. Indeed, civil servants are predominantly seen, developed and motivated as administrators and stability holders, and not as entrepreneurs, innovators and change managers. Surely, public sector institutions cannot be flexible like start-up companies are, however, the spiritual climate should be there to encourage innovative thinking and allow bright people and small teams to emerge and experiment with certain services or governance practices. To make this innovation process more cross-functional and cross-organisational, and to isolate it from daily administration functions, we suggest using so-called task forces. Originally introduced by military, these temporary or permanent and mission oriented, often multi-disciplinary teams study a particular challenge (which often involves responsibility areas of several ministries, or

even the private and non-for-profit sectors) and provide appropriate, creative and effective solutions. There are good examples where task forces have been in introduced in today's more advanced and strategically agile[45] governments; Singapore being the most famous example of how to make them an organic part of the governance system.

The research evidence showed that supportive policies have a positive effect in public service innovations, being the fourth most important external innovation supporting factor. Moreover, 65 per cent of responding organisations had an impact from public policies while innovating; at the same time only 21 per cent of them reported that their innovation required changes in laws and regulations. Based on that knowledge, we suggest, that similarly to the so-called 'third generation innovation policy' (see European Commission, 2002), which is meant to place innovation at the heart of each policy area, the innovation-minded thinking should be encouraged also across and within different governmental bodies, agencies, activities and government-focused policies. Therefore, innovation within government should be made more important policy goal in itself, deserving perhaps its own policy documents like 'innovation policy for government' and related national execution plans. Public sector innovation literature as well as the current research provide relevant knowledge in preparing these policies and plans.

The present research also provides empirically grounded knowledge for leaders of public service organisations – to the power and process promotors of government innovation. As innovativeness is typically not something formally required or directed by legal acts or regulations, then this informal role of heads and managers of different government bodies, agencies and units is extremely important. The research showed that top management commitment and support, as well as open-minded managers are equally the second most important internal innovation supporting factors, following only the existence and personal leadership of key individuals. Moreover, being attractive as an organisation to

[45] Strategic agility is a term coined by Doz and Kosonen (2008). Strategically agile companies not only learn to make fast turns and transform themselves without losing momentum but their CEOs and top teams also have higher ambitions: to make their companies permanently, regularly, able to take advantages of change and disruption. They want their organisations to learn to thrive on continues waves of change, not to periodically and painfully adjust to change. Strategic agility requires strategic sensitivity, collective commitments and resource fluidity – allowing CEOs and their management teams to perceive early, decide quickly, and strike with strength and speed.

these entrepreneurial key individuals (whose personality is often different from typical administrators) and using their contributions effectively is also the managers' job to secure.

The key to success also relies on partnerships. Innovators in the sample of the present research show that good knowledge of existing technologies together with good cooperation with technology suppliers are essential to success. These are followed by close cooperation with future user and user groups (i.e. citizen engagement) as an important internal innovation supporting factor.

Good innovators are also learning organisations. Evidence from the research shows that the cumulative accumulation of knowledge and skills is crucial for the innovation process. This innovation-related organisational learning is multi-factorial – organisations in the survey improved several intra-organisational capabilities in order to innovate (e.g. technological knowledge, project management skills, general management skills, organisational structure, and the personnel motivation system). Innovators are also learning from their own previous innovations and from external experiences, both from successes and failures. Therefore, developing and sustaining cross-functional learning environments and partnerships is crucial for being a successful innovator in the public sector. Moreover, the public service organisation managers are encouraged to extend their external learning practices beyond purely technology-related knowledge, especially if they want to act as real government leaders (see Mahbubani, 2011b and sub-chapter 2.1) in a more transformational and value adding sense.

9.4. Boundaries and limitations of the research

The results of the thesis, i.e. the nature of proposed public service innovation system framework and the factors influencing the innovation process in public sector services (predominantly IT and e-services, see annex 9) could be extended to some extent to a wider context of governments innovating, indeed these generalisations have their boundaries. Therefore, the author takes full responsibility for the results of this exercise and the results surely do not answer all of the questions one might have related to the topic of governments and public bureaucracies innovating.

There are certainly limits of the nature and scope of the research findings, which need to be taken into account when interpreting and using the results. It is an exploratory case study research carried out in a certain time frame, with limited human and financial resources, and it is limited to four countries.

From another perspective, case studies typically rely on descriptive information provided by different people and this leaves room for important details to be left out. Moreover, much of the information collected is retrospective data, recollections of past events, and is therefore subject to the problems inherent to memory and attribution bias (Dougherty, 1992). Also, the survey did not captured innovation processes over time, as well as it did not focus on overall innovation performance particular organisations but on concrete innovation projects (see annex 9).

Case studies also often involve only a few people and therefore may not be representative of the general group or population. Indeed, among the discovered public service innovations in four countries, the survey was carried out as a total survey, eliminating the typical sampling problem. Therefore, the research methods used have their limitations, which to some extent are solvable and on the other hand can be considered as natural side effects of a case study research undertaken with the naturally limited resources of student research.

As it is an exploratory study, one could challenge the definition of the unit of analysis, case identification logic and methods, and the representativeness of the survey sample as well as how well the sample was spread. Related to that, the choice of respondents within the sample can also be challenged, although we have pointed out the project manager bias several times. Indeed, asking not just the project managers, but also those further up or further down the decision-making chain, would have affected the outcomes.

There are challenges related to the fact that this is a best practice research by its nature and experience has shown this method having certain limitations such as selectivity, sustainability and comparability (Borins, 2001b; Lynn, 1996; Overman and Boyd, 1994). Additionally, as the research did not include innovation failures or non-existing innovation (from the perspective of innovation diffusion for example), therefore the usage of the dataset was surely limited.

Although the research question and design, as well as the sample size, dictated to some extent the research methods that were used, there might certainly be limitations in relation to that. Therefore, extra data would have provided opportunities to explore other methodologies – for example, multivariate analysis in addition to the univariate analysis of variance (ANOVA) we used.

In terms of geography, we choose more innovative countries rather than less. From the perspective of the world, these four countries are fairly homogenous. Therefore, a question arises how transferable would the study results be to less innovative countries. One could surely compare public service management and innovation practices of highly innovative countries with non-innovative (e.g. developing) countries in the future, depending on his/her study interest and the fundamental research question to be answered.

The purpose of the research was not to assess the impact of public sector innovations, nor were our plans to valuate or compare the innovativeness of the countries in our survey. Nor do the public sector services as a component of services sector represent fully the economy or society.

Finally, there are surely methodological challenges as innovation in the public sector is a relatively new research area and there are only few empirical and some quantitative studies in this arena. Similarly, from the theoretical perspective, the set of literature used is also exploratory and certainly debatable. This leaves room for researchers to consider alternative theoretical foundations the future public service innovation research.

9.5. Agenda for further research

Overall, the area of public sector innovation is under-researched, especially from the empirical studies aspect (i.e. compared to the private sector) and the majority of literature in this field is still (with some exceptions) full of normative assertions and/or pejorative arguments with little serious empirical work behind them. This thesis has been a best practice research leaving both the failure-cases and the organisations where innovations have not happened at all aside. Therefore, one might consider also studying public organisations from the aspect of innovation failures, or the ones not innovating at all, or to compare successes with failures. This might be even more valuable if done in an area, which in reality needs fundamental upgrading and ground-breaking innovations – be it healthcare, social affairs

or education. As the failures of large IT projects are relatively well studied (see for studies and elaborations: Standish Group International, 1995, 1996; Borins, 2001b; OECD, 2001b; United Nations, 2003; Heeks, 2001, 2006), then future studies should look more, for example, at fundamentally new governance and service models. An interesting aspect might be the comparative study of issues, why some countries (e.g. Singapore), regions or organisations can radically innovate, but others cannot.

As both the challenges and opportunities that different governments today face are cross-sectoral, cross-functional or cross-organisational (be it unemployment, education, business development, healthcare, etc), innovation researchers should focus their studies on innovations and organisational structures (e.g. task forces, 'Lego' governments, etc.) in this area. Especially valuable would be comparative studies across nations, but also across geographical regions (e.g. Northern-Europe and South-East Asia).

Public procurement also remains an important area to study from the perspective of successful innovations in the public sphere. These studies should look beyond the procurement laws, as there are examples of countries with quite progressive procurement regulations, however, where in reality the cost is still the major argument in deciding the winners. This is especially the case in purchasing unconventional or complex solutions with no relevant examples. The usage of pilot projects and related purchasing exceptions could be an interesting angle to look at government innovations and procurement.

This research has shown that public entrepreneurship, i.e. the existence of key individuals or project champions is the key to success in public services innovations. Therefore, two aspects are worth studying from this perspective. Firstly, how systematically public sector organisations are trying to discover and employ these types of people, and how they are empowered and motivated once at work within bureaucratic structures. Secondly, what remains unclear is how much different public administration, political economy and public policy programmes at universities are tackling the issues of public entrepreneurship, as well as strategic leadership and technology governance. Moreover, what are the best practices in this respect, both in the case of university education and life-long learning?

Both, from the researchers' and practitioners' perspectives, one would also expect to see proper and sustainable, transdisciplinary public sector innovation research centres developing. As we saw from the

present research, the few empirical exercises carried out around this growingly important topic, are ad hoc projects. In addition, there is also a 'small production' of predominantly qualitative case study reviews by some consultancy companies. Indeed, this chaotic and erratic production of public sector innovation knowledge does not make it realistic that will see significant changes in how countries are led and managed. Despite permanently turbulent surroundings, unsustainable state finances and social systems, and almost zero economic growth perspectives in the developed world in years to come.

We have seen throughout the thesis that research of innovation in the public sector and public service organisations is in its early stages. Therefore, the theoretical, methodological and empirical explorations of this research can be used as one of the early cornerstones to build up more coherent and systematic approaches (frameworks) in which to understand, analyse and manage innovation in the public sector. Indeed, as time goes by, it is not only public organisations and governments alone which need to innovate more systematically. To be successful as a nation in the long-run, governments, the third sector, social enterprises and the private sector should co-innovate and co-work as there will be fewer services (or industries, like healthcare) being purely public or purely private in the future. This meaning that in more successful countries, we will see totally new and deeper ways of public-private partnerships (PPPs) in the future to come. For example, as stated by Philips (Green, 2008: 9), "The biggest industries of the 21st century will be the social industries." Are they public, private or non-for-profit entities?

Finally, the exploratory nature of the study, the case study method used in the survey, together with the fact that this was a best practice research by its nature, all have their limitations. Therefore, the full responsibility of the research outcome together with possible shortcomings belongs solely to the author.

“If we knew what it was we were doing, it would not be called research, would it?”

Albert Einstein

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Annex 1 – Survey questionnaire

S P R U	When completed please send:	With questions please contact:
Freeman Centre	By e-mail: o.parna@sussex.ac.uk	**Ott Pärna** (English & Estonian) - I
University of Sussex	or by fax: +44 (0) 127 368 5865	Phone +44 (0) 799 096 0443
Falmer, Brighton BN1 9QE	or by post, see address on left	**Nick von Tunzelmann** (English) - II
UK	Reference: **"Public innovations"**	Phone: +44 (0) 127 367 8165

The data collected will be used only for scientific purposes	***ONLY CHOICE QUESTIONS** ***WILL TAKE AROUND 30 MINUTES** ***GOOD CHANCE TO LOOK BACK ON YOUR SUCCESS**

TECHNOLOGICALLY INNOVATIVE PUBLIC SERVICES

QUESTIONNAIRE

Questions should be answered from the viewpoint of having developed a concrete case of innovative public service *(the innovation)* in which you were involved in the research (see the covering letter).

A. GENERAL FRAMEWORK *(Please tick appropriate box)*

A1. To which field of public services does the service belong?		**A2. Which part of your service did your innovation mainly influence?**	
1. Social services		1. Service delivery (front office)[1]	
2. Education services		2. Process integration (back office)[2]	
3. Other knowledge services		3. Front office and back office	
4. Logistical and environmental services		4. Other (please specify).....	
5. Business services		.....	
6. Personal ID services			
7. General administration portals[3]			
8. eDemocracy services			
A3. Did your service exist before the innovation?		**A4. Where was your innovation developed?**	
1. Yes		1. In-house (inside your organisation)	
2. No		2. Externally (outside your organisation)[4]	
3. Partly		3. Partly in-house, partly externally	
A5. At what level of public administration is your service provided?		**A6. Who is providing your innovative service?**	
1. Local (e.g. municipal)		1. Public entity (incl. public under private law)	
2. Regional (e.g. county)		2. Private entity	
3. National (e.g. central government)		3. Public and private entities in cooperation	
4. International		4. Non-profit institution	
		5. Academic institution	

B. ORGANISATIONAL CAPABILITIES *(Please tick appropriate boxes)*

B1. Which organisational capabilities did you improve internally in order to innovate?		**B2. Which capabilities did you obtain externally?**	
1. General managerial skills		1. Managerial advice/support	
2. Project management skills		2. Project management advice/support	
3. Technological knowledge		3. Technological advice/support	
4. Organisational structure		4. Human resource management advice/support	
5. Motivation system of personnel		5. Other (please specify).....	
6. Other (please specify).....		.....	
.....		6. No external capabilities were obtained	
7. None of the capabilities were improved			

B3. Has your organisation any previous experiences with similar innovations?		**B4. Had you learned from the previous experiences while innovating?**	
1. Yes, positive experiences		1. Yes, from previous negative experiences within the organisation	
2. Yes, negative experiences		2. Yes, from previous positive experiences within the organisation	
3. No		3. Yes, from previous negative experiences outside the organisation	
		4. Yes, from previous positive experiences outside the organisation	
		5. No	

C. GOAL OF INNOVATION

C1. What were the main goals of the innovation? *(Please tick appropriate boxes)*

1 = not important; 2 = little important; 3 = important; 4 = very important

	1	2	3	4
1. To go online				
2. To improve the take-up of the service[5]				
3. To raise service diversity (personalised service)[6]				
4. To improve the quality of the service				
5. To reduce the cost of the service				
6. To reduce the time spent on service delivery (incl. waiting time)				
7. To improve transparency				
8. To improve/change organisational behaviour				
9. To improve the competitiveness of the organisation				
10. To use the existing technological possibilities				
11. To respond to user needs (user group needs)				
12. To gain social or political popularity				
13. Other, please specify…….…….. ……..				
14. Which was **the most** important goal from the abovementioned (№)				
15. Which was **the least** important goal from the abovementioned (№)				

D. SUPPORT FOR AND MOTIVATION TO INNOVATE

D1. Please assess the importance of different internal supporting/motivating factors for the innovation *(Please tick appropriate boxes)*

1 = not important; 2 = little important; 3 = important; 4 = very important

	1	2	3	4
1. Supportive organisational strategy (written/codified)				
2. Top-management commitment and support				
3. Open-minded managers				
4. Hierarchical (top-down) power[7]				
5. Personal leadership or committed 'key' individuals[8]				
6. Available mandate, motivation and tools of the project manager				
7. Innovation accepting organisational culture				
8. Flexible organisational structure				
9. Good knowledge of existing technologies				
10. Close cooperation with technology suppliers				
11. Good market knowledge (existence of client surveys, etc)				
12. Close cooperation with future users/user groups				
13. Internal learning capabilities				
14. Other, please specify……..... ……..				
15. Which was **the most** important factor from the abovementioned (№)				
16. Which was **the least** important factor from the abovementioned (№)				

D2. Please assess the importance of different external supporting/motivating factors for the innovation *(Please tick appropriate boxes)*

1 = not important; 2 = little important; 3 = important; 4 = very important

	1	2	3	4
1. Political demand				
2. Political commitment to long-term major projects				
3. Supportive policies (international, national, regional or local)				
4. Appropriate laws and regulations				
5. Competition				
6. Budgetary pressure[9]				
7. Existence of good examples (best practices)				
8. Technology push (incl. lobbying by technology suppliers)				
9. Low technological risk				
10. Good cooperation with partners (eg. intermediates, tech. providers)				
11. User demand				
12. User trust				
13. Other, please specify…….…….. ……..				
14. Which was **the most** important factor from the abovementioned (№)				
15. Which was **the least** important factor from the abovementioned (№)				

E. OBSTACLES TO INNOVATE

E1. Please assess the importance of internal hampering factors faced during the innovation process *(Please tick appropriate boxes)*

1 = not important; 2 = little important; 3 = important; 4 = very important

	1	2	3	4
1. No supportive organisational strategy (written/codified)				
2. Weak top-management commitment and support				
3. Close-minded managers				
4. Lack of hierarchical (top-down) power				
5. Lack of personal leadership or committed 'key' individuals				
6. Lack of ideas				
7. Lack of mandate, tools & motivation for project manager				
8. Stagnating organisational culture				
9. Rigid organisational structure				
10. Previous negative experiences/failures				
11. Lack of knowledge about existing technologies				
12. Weak cooperation with technology suppliers				
13. Lack of market knowledge (no user surveys, etc)				
14. Weak cooperation with future users/user groups				
15. Other, please specify…… ……				
16. Which was **the most** important factor from the abovementioned (№)				
17. Which was **the least** important factor from the abovementioned (№)				

E2. Please assess the importance of external hampering factors faced during the innovation process *(Please tick appropriate boxes)*

1 = not important; 2 = little important; 3 = important; 4 = very important

	1	2	3	4
1. No or weak political demand				
2. No political commitment to long-term projects				
3. Lack of supportive policies (international, national, regional, local)				
4. Inappropriate/rigid laws and regulations				
5. Lack of financial resources to develop the innovation				
6. High political/reputational risk				
7. High technological risk				
8. Weak cooperation with partners (e.g. intermediates, tech. providers)				
9. Absence of relevant good examples (best practices)				
10. Lack of user demand				
11. Lack of trust				
12. Digital divide[10]				
13. Other, please specify…… ……				
14. Which was **the most** important factor from the abovementioned (№)				
15. Which was **the least** important factor from the abovementioned (№)				

F. RESULTS

F1. Please assess the importance of the results of your innovation *(Please tick appropriate boxes)*

1 = not important; 2 = little important; 3 = important; 4 = very important

	1	2	3	4
1. Available online service				
2. Improved take-up of the service				
3. Raised service diversity (e.g. more personalised services)				
4. Improved service quality				
5. Reduced service cost				
6. Reduced time spent on the service delivery (incl. waiting time)				
7. Improved transparency				
8. Improved/changed organisational behaviour				
9. Improved competitiveness of the organisation				
10. Used existing technological possibilities				
11. Satisfied users (or user groups)				
12. Gained social or political popularity				
13. Other, please specify…… ……				
14. Which was **the most** important result from the abovementioned (№)				
15. Which was **the least** important result from the abovementioned (№)				

G. OTHER *(Please tick appropriate boxes)*			
G1. Did the innovation require any changes in laws and regulations?		**G2. Was your innovation motivated or influenced by written/codified public policy?**	
1. Yes, in local/regional laws and regulations		1. Yes, by local/regional policies	
2. Yes, in national laws and regulations		2. Yes, by national (governmental) policies	
3. No		3. Yes, by international policies	
		4. No	
G3. Does the usage of your innovation require legally valid authorisation of the user[11]?		**G4. Which methods do you use for the authorisation of the user?**	
1. Yes		1. ID Card and related infrastructure	
2. No		2. Identification systems of commercial banks	
		3. Basic *sign-up* identification (legally not valid)	
		4 Other (please specify)…….....…… ……..……	
		5. Users are not identified	
G5. Which sources were used to finance the development of your innovation?		**G6. Which methods were used to market your new innovative service?**	
1. Ordinary public annual budget		1. Offline methods (booklets, newspapers, etc)	
2. Specially extended public annual budget		2. Online methods (banners in web-pages, etc)	
3. Loan or leasing		3. Via satisfied costumers (i.e. face-to-face)	
4. National, regional or local funds (or specific programmes)		4. Other, please specify…… …….....	
5. International funds (or specific programmes)		5. No marketing used	
6. Other (please specify)…….... ……...			
G7. Has the "success" of your innovation been measured?		**G8. In terms of initial expectations, how do you rate the current results of your innovation?**	
1. Yes, by identifying user-performance automatically by the system		1. Excellent	
2. Yes, by online user-questionnaires		2. Good	
3. Yes, by offline user-questionnaires		3. Average	
4. Yes but with other methods (please specify)… …….....		4. Poor	
5. No			

H. RESPONDENT DETAILS		
1. Name of the innovative service:		
2. Start of developing the innovation:	(a) year:	(b) month:
3. Time of launching the innovation:	(a) year:	(b) month:
4. Languages the service is available:		
5. Internet address of the service:		
6. Name of the organisation:		
7. Respondent's organisation (if different):		
8. Name of the respondent(s):		
9. Position of respondent(s):		
10. E-mail:		
11. Telephone:		
12. Fax:		

We appreciate your cooperation and hope that this exercise was also useful ☺ for you! Do you feel so?	Yes	No

We have not asked you about any 'traditionally' confidential information; nevertheless, everything we receive will be used only for scientific purposes, and if necessary will be treated with utmost confidentiality. If you feel that the latter is necessary, please tick the box.	

Thank You!

Definitions and clarifications

[1] **Service delivery (front office)** – computer infrastructure in an organisation designed specifically as an interface for communicating with external customers, such as Web sites or portals.
[2] **Process integration (back office)** – computer infrastructure in an organisation which supports core business process applications but has no external interface with customers (unlike a Web site or portal).
[3] **Portal** – any well-used gateway to the Internet, especially those sites designed to serve as a 'front door' or first page that users see when accessing the Web. Portals typically provide large catalogues of other sites, powerful search engines for locating information, and e-mail facilities or other attractive Web services.
[4] **Externally (outside your organisation)** – the development of the innovation was out-sourced.
[5] **To improve the take-up of the service** – the service can be used by more or wider range of people (user-groups).
[6] **To raise service diversity (personalised service)** – the service can be more personalised, more variations of the service are available, etc.
[7] **Hierarchical (top-down) power** – is considered as an internal supporting/motivating factor as it could be an efficient way to initiate, manage and finish an innovation within the organisation.
[8] **Personal leadership or committed 'key' individuals** – means the existence of persons with strong (voluntary or mandatory) commitment to the development of the project (innovation).
[9] **Budgetary pressure** – is considered as an external supporting/motivating factor as it could lead to the introduction of technologically creative solutions which could be cheaper to run than the traditional way of service delivery.
[10] **Digital divide** – describes the fact that the world can be divided into people who do and people who don't have access to - and the capability to use - modern information technology, such as the telephone, television, or the Internet. The digital divide exists for example between those in cities and those in rural areas. It also exists between the educated and the uneducated, between economic classes, and, globally, between the more and less industrially developed nations.
[11] **Legally valid authorisation of the user** – means that the user is identified in a legally valid way, e.g. by ID card, authorisation systems of commercial internet banks, etc.

Annex 2 – General framework statistics of cases (A)

A1. To which field of public service does the service belong?

Statistics									
	N	**A1.1**	**A1.2**	**A1.3**	**A1.4**	**A1.5**	**A1.6**	**A1.7**	**A1.8**
ALL	Valid	13	7	14	13	9	8	12	5
	Missing	68	74	67	68	72	73	69	76
UK	Valid	2	1	3	5	1	1	2	0
	Missing	13	14	12	10	14	14	13	15
DK	Valid	6	2	3	0	2	0	4	1
	Missing	12	16	15	18	16	18	14	17
FIN	Valid	2	2	3	3	2	3	3	2
	Missing	18	18	17	17	18	17	17	18
EST	Valid	3	2	5	5	4	4	3	2
	Missing	25	26	23	23	24	24	25	26

A2. Which part of your service did your innovation mainly influence?

Statistics				
	N	**A2.1**	**A2.2**	**A2.3**
ALL	Valid	22	2	57
	Missing	59	79	24
UK	Valid	8	2	5
	Missing	7	13	10
DK	Valid	4	0	14
	Missing	14	18	4
FIN	Valid	7	0	13
	Missing	13	20	7
EST	Valid	3	0	25
	Missing	25	28	3

A3. Did your service exist before the innovation?

Statistics				
	N	**A3.1**	**A3.2**	**A3.3**
ALL	Valid	19	40	21
	Missing	62	41	60
UK	Valid	3	7	5
	Missing	12	8	10
DK	Valid	2	12	3
	Missing	16	6	15
FIN	Valid	4	11	5
	Missing	16	9	15
EST	Valid	10	10	8
	Missing	18	18	20

A4. Where was your innovation developed?

Statistics				
	N	**A4.1**	**A4.2**	**A4.3**
ALL	Valid	19	6	55
	Missing	62	75	26
UK	Valid	5	0	10
	Missing	10	15	5
DK	Valid	3	4	10
	Missing	15	14	8
FIN	Valid	8	1	11
	Missing	12	19	9
EST	Valid	3	1	24
	Missing	25	27	4

A5. At what level of public administration is your service provided?

Statistics					
	N	**A5.1**	**A5.2**	**A5.3**	**A5.4**

ALL	Valid	4	11	49	17
	Missing	77	70	32	64
UK	Valid	0	1	12	2
	Missing	15	14	3	13
DK	Valid	3	7	7	1
	Missing	15	11	11	17
FIN	Valid	0	1	15	4
	Missing	20	19	5	16
EST	Valid	1	2	15	10
	Missing	27	26	13	18

A6. Who is providing your innovative service?

Statistics						
	N	**A6.1**	**A6.2**	**A6.3**	**A6.4**	**A6.5**
ALL	Valid	33	11	31	5	1
	Missing	48	70	50	76	80
UK	Valid	6	1	7	1	0
	Missing	9	14	8	14	15
DK	Valid	7	2	6	2	1
	Missing	11	16	12	16	17
FIN	Valid	8	5	6	1	0
	Missing	12	15	14	19	20
EST	Valid	12	3	12	1	0
	Missing	16	25	16	27	28

Annex 3 – General framework statistics of cases (G)

G1. Did the innovation require any changes in laws and regulations?

Statistics				
	N	**G1.1**	**G1.2**	**G1.3**
ALL	Valid	4	13	63
	Missing	77	68	18
UK	Valid	1	0	14
	Missing	14	15	1
DK	Valid	0	3	14
	Missing	18	15	4
FIN	Valid	0	2	18
	Missing	20	18	2
EST	Valid	3	8	17
	Missing	25	20	11

G2. Was your innovation motivated or influenced by written/codified public policy?

Statistics					
	N	**G2.1**	**G2.2**	**G2.3**	**G2.4**
ALL	Valid	6	46	10	28
	Missing	75	35	71	53
UK	Valid	0	12	0	3
	Missing	15	3	15	12
DK	Valid	3	7	3	7
	Missing	15	11	15	11
FIN	Valid	2	13	2	5
	Missing	18	7	18	15
EST	Valid	1	14	5	13
	Missing	27	14	23	15

G3. Does the usage of your innovation require legally valid authorisation of the user?

Statistics			
	N	**G3.1**	**G3.2**
ALL	Valid	26	54
	Missing	55	27
UK	Valid	2	13
	Missing	13	2
DK	Valid	7	10
	Missing	11	8
FIN	Valid	4	16
	Missing	16	4
EST	Valid	13	15
	Missing	15	13

G4. Which methods do you use for the authorisation of the user?

Statistics						
	N	**G4.1**	**G4.2**	**G4.3**	**G4.4**	**G4.5**
ALL	Valid	23	11	22	16	31
	Missing	58	70	59	65	50
UK	Valid	0	1	8	2	7
	Missing	15	14	7	13	8
DK	Valid	1	0	4	5	5
	Missing	17	18	14	13	13
FIN	Valid	6	3	2	4	11
	Missing	14	17	18	16	9
EST	Valid	16	7	8	5	8
	Missing	12	21	20	23	20

G5. Which sources were used to finance the development of your innovation?

Statistics							
	N	**G5.1**	**G5.2**	**G5.3**	**G5.4**	**G5.5**	**G5.6**

ALL	Valid	40	18	1	27	11	9
	Missing	41	63	80	54	70	72
UK	Valid	8	1	1	4	0	2
	Missing	7	14	14	11	15	13
DK	Valid	4	6	0	11	2	0
	Missing	14	12	18	7	16	18
FIN	Valid	12	4	0	8	2	2
	Missing	8	16	20	12	18	18
EST	Valid	16	7	0	4	7	5
	Missing	12	21	28	24	21	23

G6. Which methods were used to market your new innovative service?

Statistics						
	N	**G6.1**	**G6.2**	**G6.3**	**G6.4**	**G6.5**
ALL	Valid	63	53	45	10	6
	Missing	18	28	36	71	75
UK	Valid	12	11	6	0	2
	Missing	3	4	9	15	13
DK	Valid	14	11	10	2	0
	Missing	4	7	8	16	18
FIN	Valid	19	13	15	3	1
	Missing	1	7	5	17	19
EST	Valid	18	18	14	5	3
	Missing	10	10	14	23	25

G7. Has the success of your innovation been measured?

Statistics						
	N	**G7.1**	**G7.2**	**G7.3**	**G7.4**	**G7.5**
ALL	Valid	42	31	27	15	11
	Missing	39	50	54	66	70
UK	Valid	10	9	6	1	1
	Missing	5	6	9	14	14
DK	Valid	10	6	6	3	1
	Missing	8	12	12	15	17
FIN	Valid	10	9	8	9	1
	Missing	10	11	12	11	19
EST	Valid	12	7	7	2	8
	Missing	16	21	21	26	20

G8. In terms of initial expectation, how do you rate the current results of your innovation?

Statistics					
	N	**G8.1**	**G8.2**	**G8.3**	**G8.4**
ALL	Valid	24	49	5	1
	Missing	57	32	76	80
UK	Valid	7	6	1	0
	Missing	8	9	14	15
DK	Valid	5	12	0	0
	Missing	13	6	18	18
FIN	Valid	7	13	0	0
	Missing	13	7	20	20
EST	Valid	5	18	4	1
	Missing	23	10	24	27

H. Length of innovation development (months).

Statistics					
N	**ALL**	**UK**	**DK**	**FIN**	**EST**
Valid	73	14	14	19	26
Missing	8	1	4	1	2
Mean	17.37	19.29	20.00	17.26	15.00

H2. Starting year of developing the innovation.

			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
ALL		1994	1	1.2	1.3	1.3

		1995	1	1.2	1.3	2.6
		1996	4	4.9	5.3	7.9
		1997	1	1.2	1.3	9.2
		1998	3	3.7	3.9	13.2
		1999	5	6.2	6.6	19.7
		2000	18	22.2	23.7	43.4
		2001	12	14.8	15.8	59.2
		2002	14	17.3	18.4	77.6
		2003	14	17.3	18.4	96.1
		2004	3	3.7	3.9	100.0
		Total	76	93.8	100.0	
	Missing	System	5	6.2		
	Total		81	100.0		
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
UK		1994				
		1995				
		1996				
		1997				
		1998	1	6.7	7.1	7.1
		1999	1	6.7	7.1	14.3
		2000	4	26.7	28.6	42.9
		2001				
		2002	2	13.3	14.3	57.1
		2003	5	33.3	35.7	92.9
		2004	1	6.7	7.1	100.0
		Total	14	93.3	100.0	
	Missing	System	1	6.7		
	Total		15	100.0		
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
DK		1994	1	5.6	6.3	6.3
		1995				
		1996				
		1997				
		1998				
		1999	1	5.6	6.3	12.5
		2000	1	5.6	6.3	18.8
		2001	8	44.4	50.0	68.8
		2002	5	27.8	31.3	100.0
		2003				
		2004				
		Total	16	88.9	100.0	
	Missing	System	2	11.1		
	Total		18	100.0		
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
FIN		1994				
		1995				
		1996	2	10.0	10.5	10.5
		1997	1	5.0	5.3	15.8
		1998	2	10.0	10.5	26.3
		1999	2	10.0	10.5	36.8
		2000	7	35.0	36.8	73.7
		2001	1	5.0	5.3	78.9
		2002	3	15.0	15.8	94.7
		2003	1	5.0	5.3	100.0
		2004				
		Total	19	95.0	100.0	
	Missing	System	1	5.0		
	Total		20	100.0		

			Frequency	Percent	Valid Percent	Cumulative Percent
EST		1994				
		1995	1	3.6	3.7	3.7
		1996	2	7.1	7.4	11.1
		1997				
		1998				
		1999	1	3.6	3.7	14.8
		2000	6	21.4	22.2	37.0
		2001	3	10.7	11.1	48.1
		2002	4	14.3	14.8	63.0
		2003	8	28.6	29.6	92.6
		2004	2	7.1	7.4	100.0
		Total	27	96.4	100.0	
	Missing	System	1	3.6		
	Total		28	100.0		

H4. Number of languages the service is available.

			Frequency	Percent	Valid Percent	Cumulative Percent
ALL		1	39	48.1	48.8	48.8
		2	20	24.7	25.0	73.8
		3	19	23.5	23.8	97.5
		5	1	1.2	1.3	98.8
		7	1	1.2	1.3	100.0
		Total	80	98.8	100.0	
	Missing	System	1	1.2		
	Total		81	100.0		
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
UK		1	8	53.3	53.3	53.3
		2	6	40.0	40.0	93.3
		7	1	6.7	6.7	100.0
		Total	15	100.0	100.0	
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
DK		1	16	88.9	88.9	88.9
		2	2	11.1	11.1	100.0
		Total	18	100.0	100.0	
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
FIN		1	2	10.0	10.0	10.0
		2	6	30.0	30.0	40.0
		3	11	55.0	55.0	95.0
		5	1	5.0	5.0	100.0
		Total	20	100.0	100.0	
			Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
EST		1	13	46.4	48.1	48.1
		2	6	21.4	22.2	70.4
		3	8	28.6	29.6	100.0
		Total	27	96.4	100.0	
	Missing	System	1	3.6		
	Total		28	100.0		

Annex 4 – Organisational capabilities (B)

B1. Which organisational capabilities did you improve internally in order to innovate?

Statistics								
	N	**B1.1**	**B1.2**	**B1.3**	**B1.4**	**B1.5**	**B1.6**	**B1.7**
ALL	Valid	27	51	55	22	12	3	5
	Missing	54	30	26	59	69	78	76
UK	Valid	6	11	11	5	1	1	1
	Missing	9	4	4	10	14	14	14
DK	Valid	7	13	11	7	5	1	0
	Missing	11	5	7	11	13	17	18
FIN	Valid	4	9	13	4	4	1	3
	Missing	16	11	7	16	16	19	17
EST	Valid	10	18	20	6	2	0	1
	Missing	18	10	8	22	26	28	27

B2. Which capabilities did you obtain externally?

Statistics							
	N	**B2.1**	**B2.2**	**B2.3**	**B2.4**	**B2.5**	**B2.6**
ALL	Valid	9	17	65	4	4	7
	Missing	72	64	16	77	77	74
UK	Valid	5	4	13	0	1	1
	Missing	10	11	2	15	14	14
DK	Valid	0	3	13	1	2	1
	Missing	18	15	5	17	16	17
FIN	Valid	0	5	16	0	1	3
	Missing	20	15	4	20	19	17
EST	Valid	4	5	23	3	0	2
	Missing	24	23	5	25	28	26

B3. Has your organisation any previous experiences with similar innovations?

Statistics				
	N	**B3.1**	**B3.2**	**B3.3**
ALL	Valid	42	9	36
	Missing	39	72	45
UK	Valid	8	2	6
	Missing	7	13	9
DK	Valid	11	1	6
	Missing	7	17	12
FIN	Valid	10	4	9
	Missing	10	16	11
EST	Valid	13	2	15
	Missing	15	26	13

B4. Had you learned from the previous experiences while innovating?

Statistics						
	N	**B4.1**	**B4.2**	**B4.3**	**B4.4**	**B4.5**
ALL	Valid	17	31	18	34	15
	Missing	64	50	63	47	66
UK	Valid	5	8	4	5	2
	Missing	10	7	11	10	13
DK	Valid	3	6	1	5	4
	Missing	15	12	17	13	14
FIN	Valid	7	9	7	11	3
	Missing	13	11	13	9	17
EST	Valid	2	8	6	13	6
	Missing	26	20	22	15	22

Annex 5 – Goals and results of innovation (C and F)

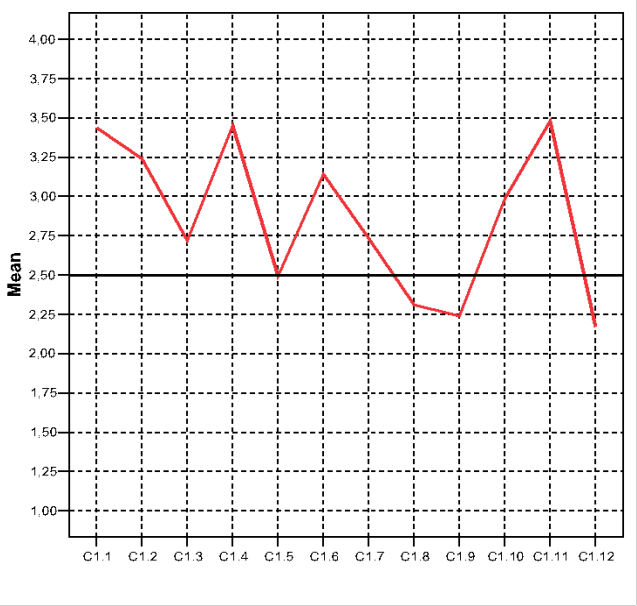
Means of total sample for questions C1.1 – C1.12 (goals of innovation); F1.1 – F1.12 (results of innovation)

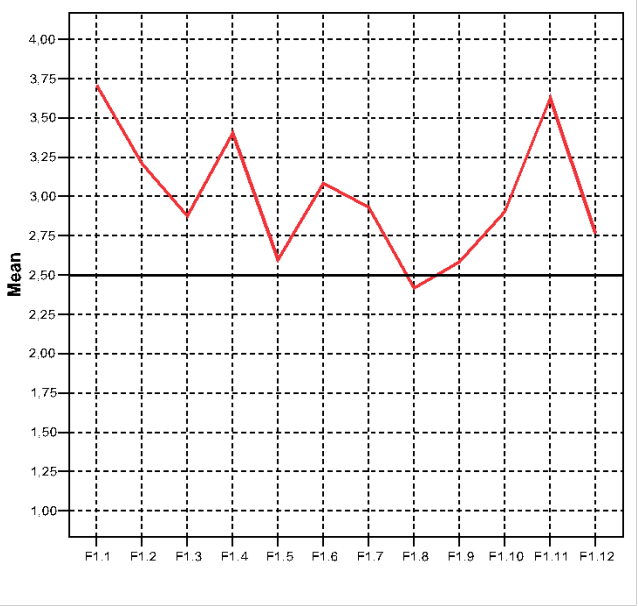
Statistics

		C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9	C1.10	C1.11	C1.12
N	Valid	77	77	76	80	77	78	78	78	75	77	79	77
	Missing	4	4	5	1	4	3	3	3	6	4	2	4
Mean		3,43	3,30	2,72	3,49	2,53	3,19	2,76	2,37	2,24	3,00	3,52	2,21

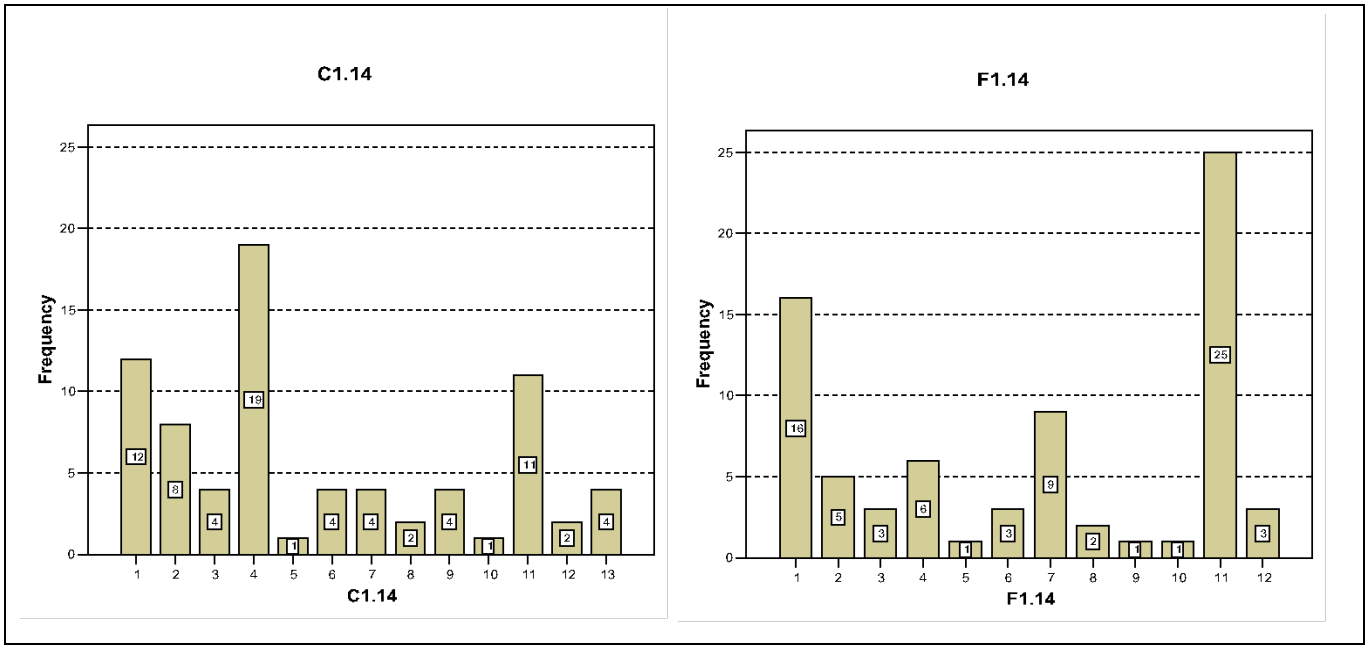
Statistics

		F1.1	F1.2	F1.3	F1.4	F1.5	F1.6	F1.7	F1.8	F1.9	F1.10	F1.11	F1.12
N	Valid	77	78	77	79	77	77	78	77	77	78	79	77
	Missing	4	3	4	2	4	4	3	4	4	3	2	4
Mean		3,71	3,23	2,86	3,43	2,60	3,08	2,94	2,42	2,51	2,88	3,62	2,75

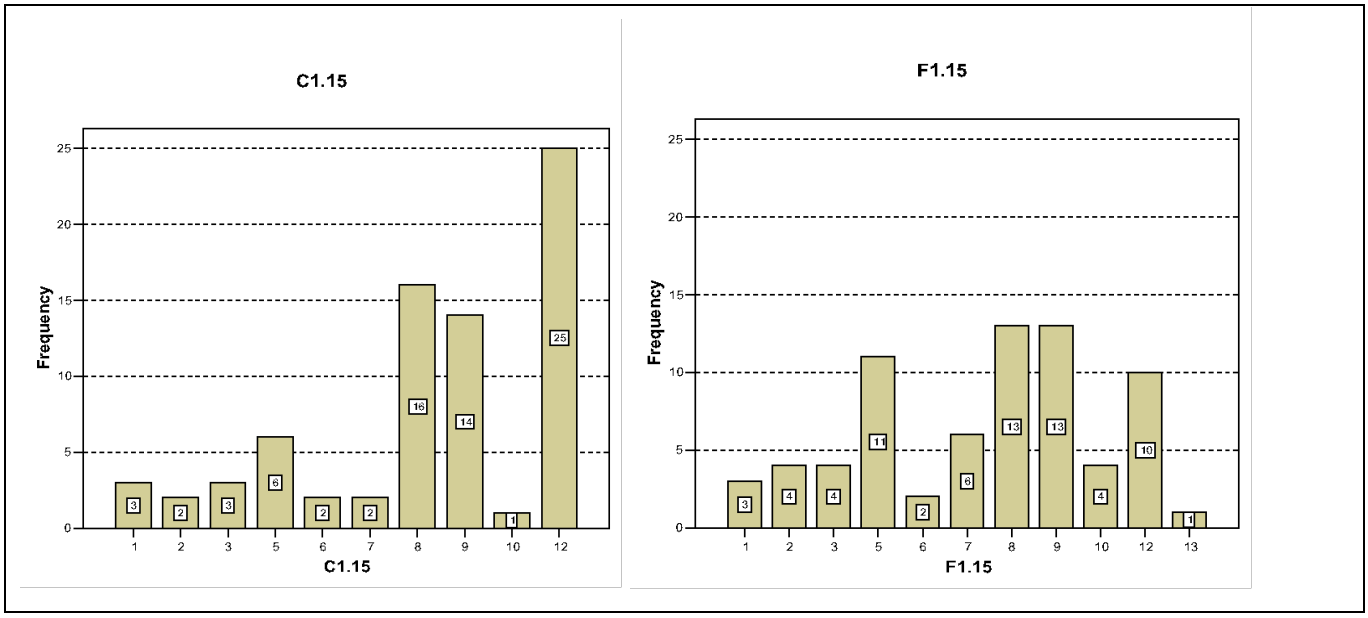




Single most important goal (C1.14) and single most important result (F1.14) of innovation in total sample



Single least important goal (C1.15) and single least important result (F1.15) of innovation in total sample



Means of the UK for questions C1.1 – C1.12 (goals of innovation); F1.1 – F1.12 (results of innovation)

Statistics[a]

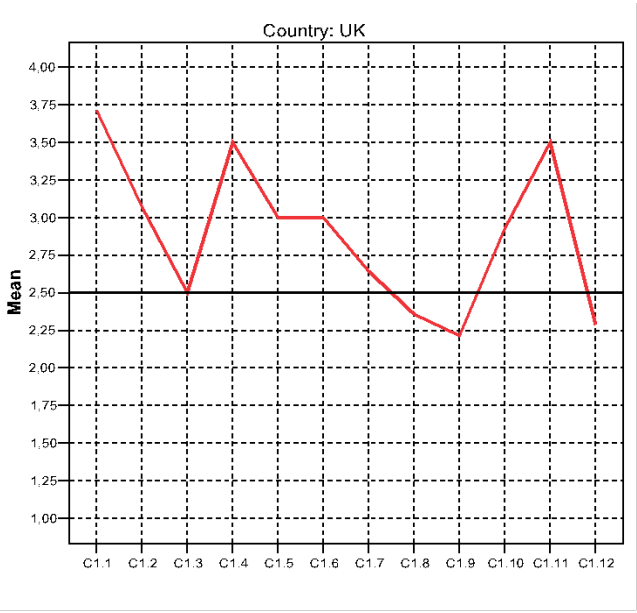
		C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9	C1.10	C1.11	C1.12
N	Valid	15	15	15	15	14	15	15	14	14	15	15	14
	Missing	0	0	0	0	1	0	0	1	1	0	0	1
Mean		3,73	3,13	2,60	3,53	3,00	3,07	2,73	2,36	2,21	2,93	3,53	2,29

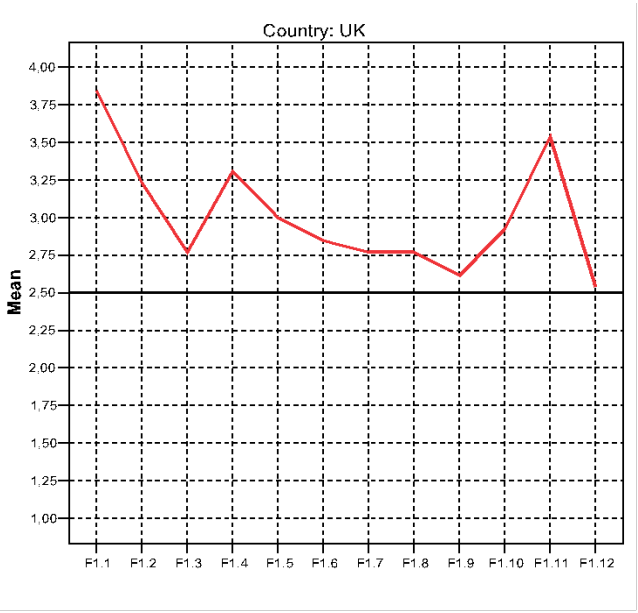
a. Country = UK

Statistics[a]

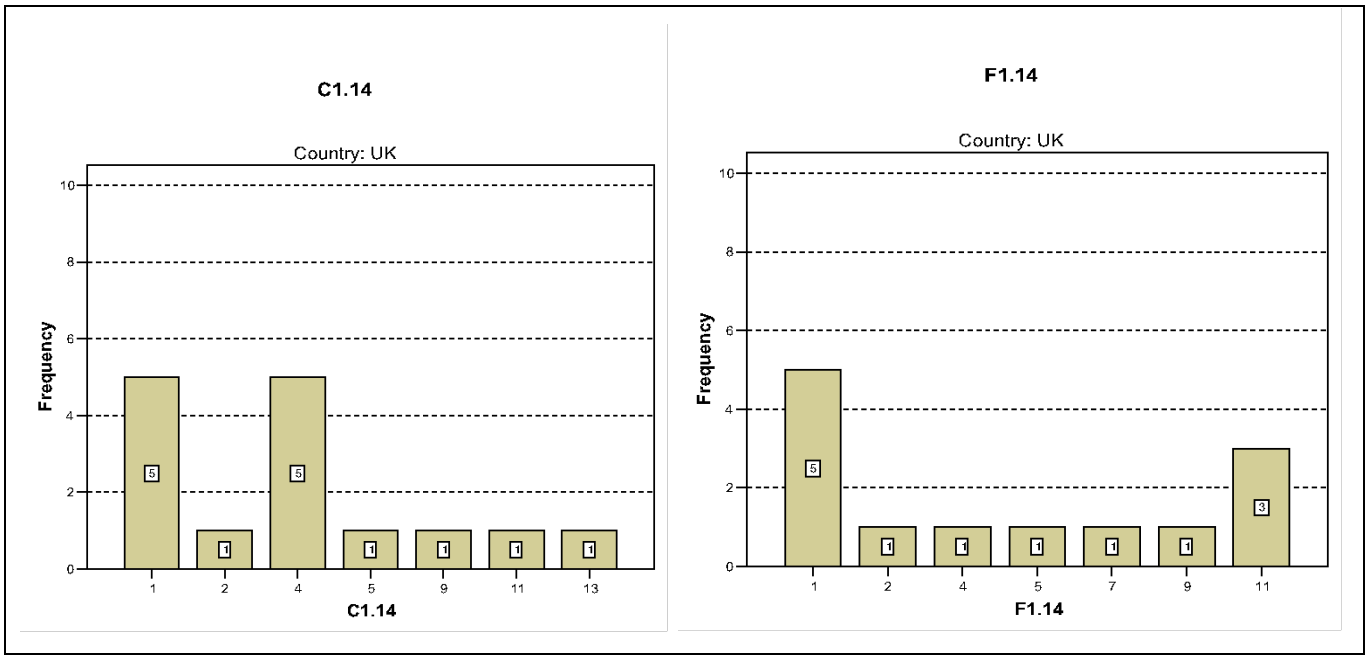
		F1.1	F1.2	F1.3	F1.4	F1.5	F1.6	F1.7	F1.8	F1.9	F1.10	F1.11	F1.12
N	Valid	15	15	15	15	14	14	15	14	14	15	15	14
	Missing	0	0	0	0	1	1	0	1	1	0	0	1
Mean		3,80	3,20	2,73	3,33	2,93	2,86	2,67	2,64	2,50	2,93	3,53	2,57

a. Country = UK

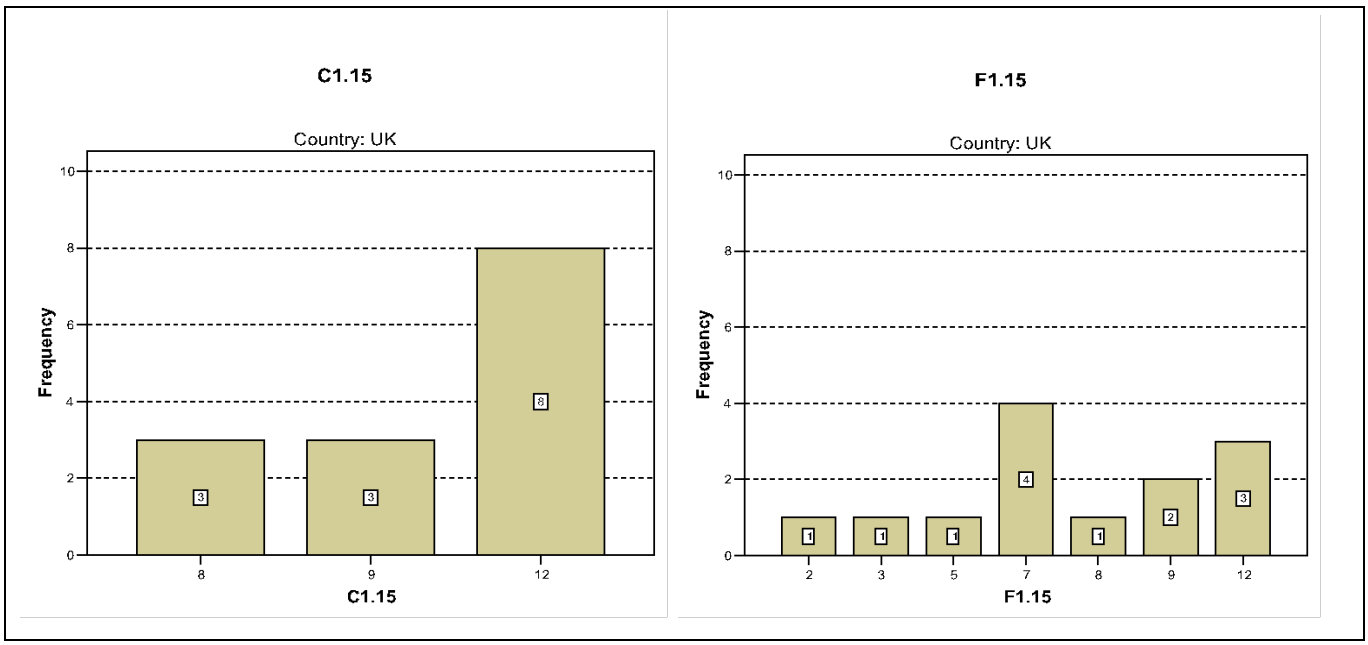




Single most important goal (C1.14) and single most important result (F1.14) of innovation in the UK



Single least important goal (C1.15) and single least important result (F1.15) of innovation in the UK



Means of Denmark for questions C1.1 – C1.12 (goals of innovation); F1.1 – F1.12 (results of innovation)

Statistics[a]

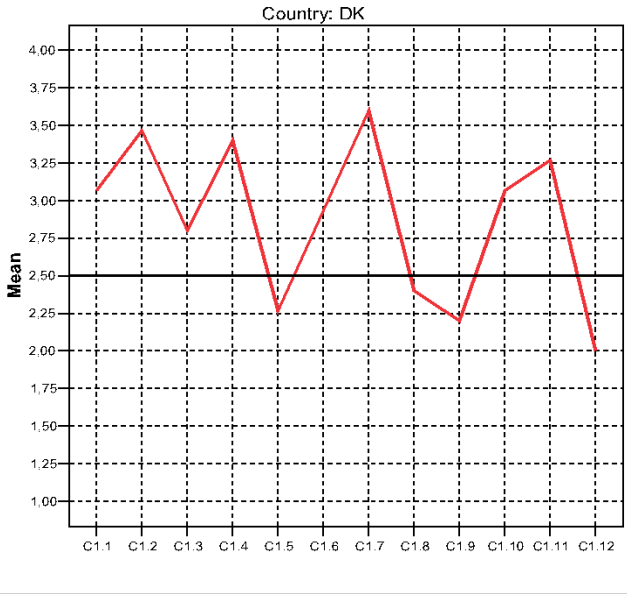
		F1.1	F1.2	F1.3	F1.4	F1.5	F1.6	F1.7	F1.8	F1.9	F1.10	F1.11	F1.12
N	Valid	17	16	15	16	16	16	16	16	16	16	16	16
	Missing	1	2	3	2	2	2	2	2	2	2	2	2
Mean		3,65	3,31	2,93	3,44	2,25	2,50	3,31	2,38	2,38	2,88	3,50	2,69

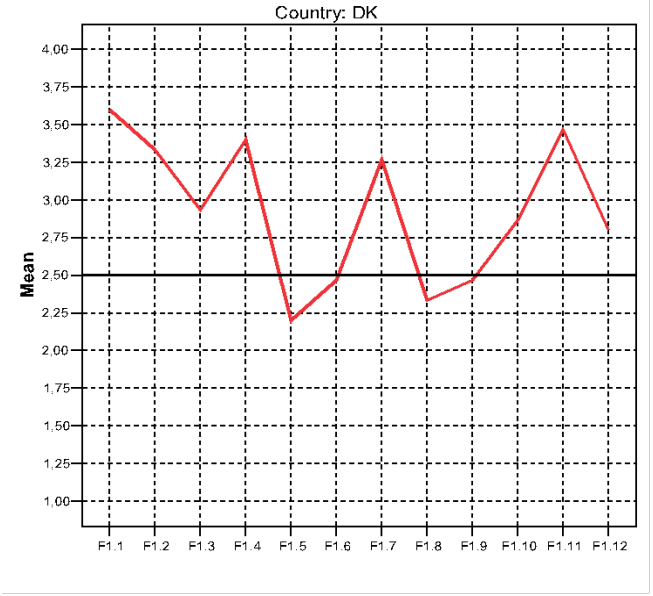
a. Country = DK

Statistics[a]

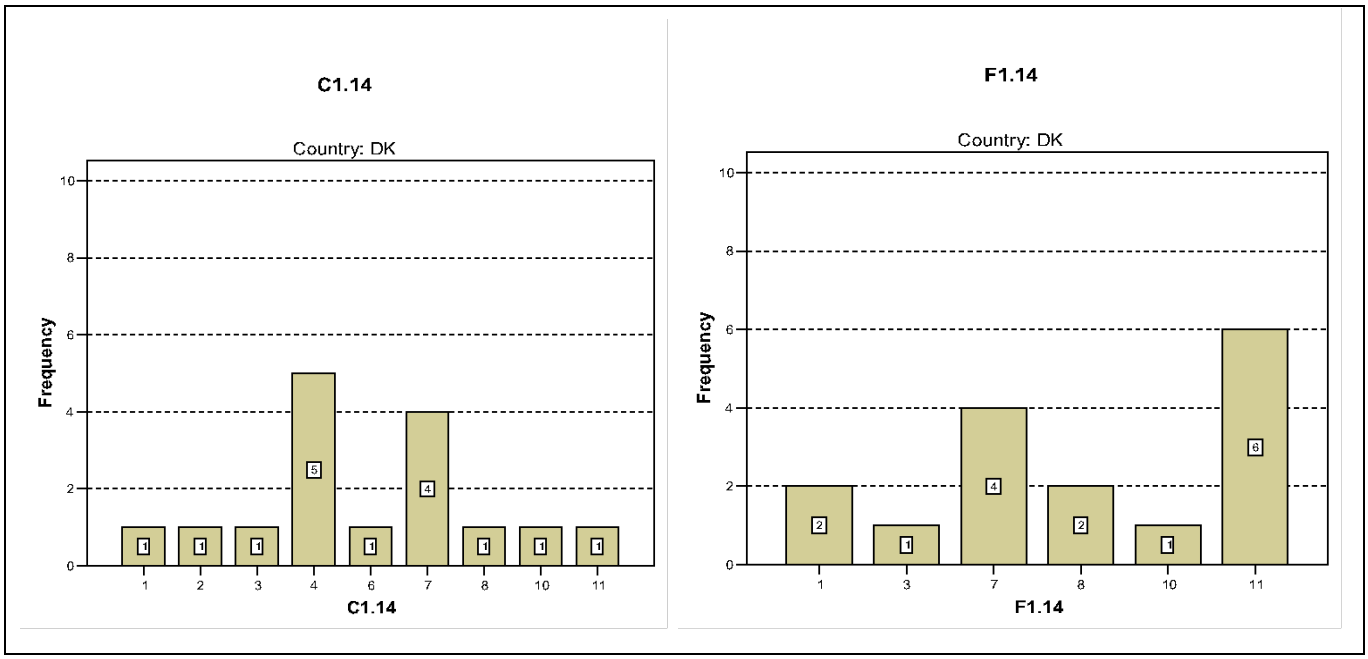
		C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9	C1.10	C1.11	C1.12
N	Valid	17	17	15	17	16	16	17	17	16	17	17	17
	Missing	1	1	3	1	2	2	1	1	2	1	1	1
Mean		3,00	3,53	2,80	3,47	2,38	3,00	3,59	2,53	2,19	3,12	3,35	2,12

a. Country = DK

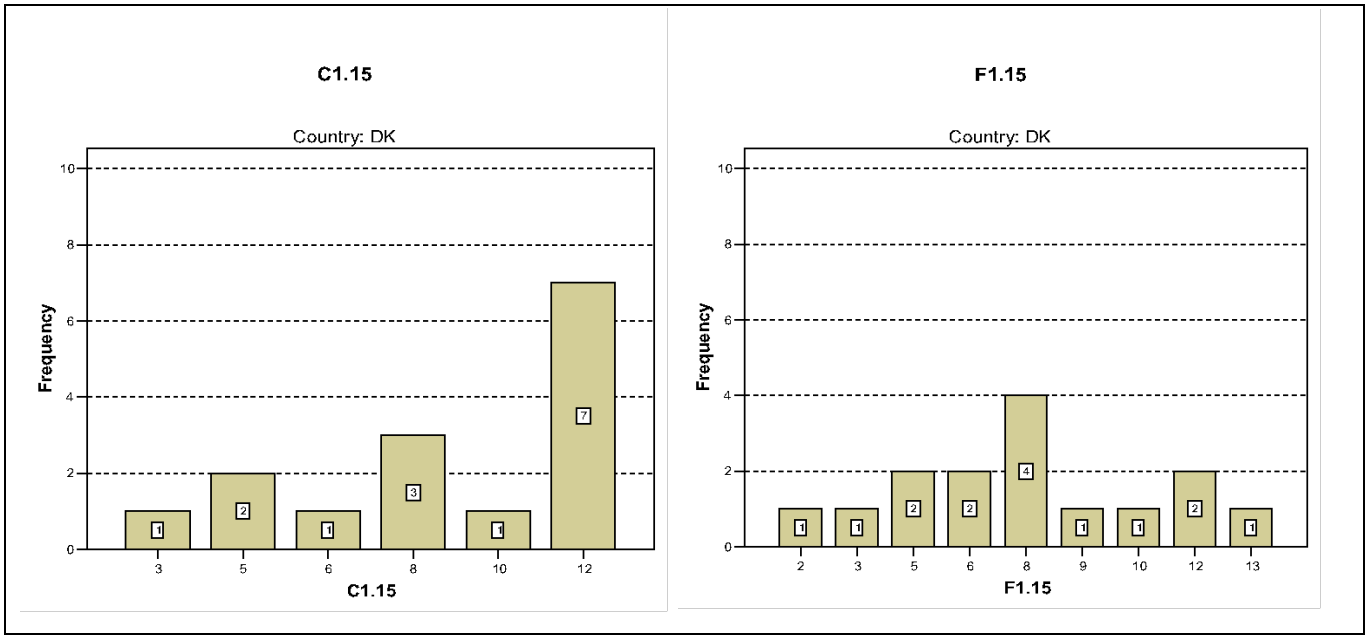




Single most important goal (C1.14) and single most important result (F1.14) of innovation in Denmark



Single least important goal (C1.15) and single least important result (F1.15) of innovation in Denmark



Means of Finland for questions C1.1 – C1.12 (goals of innovation); F1.1 – F1.12 (results of innovation)

Statistics[a]

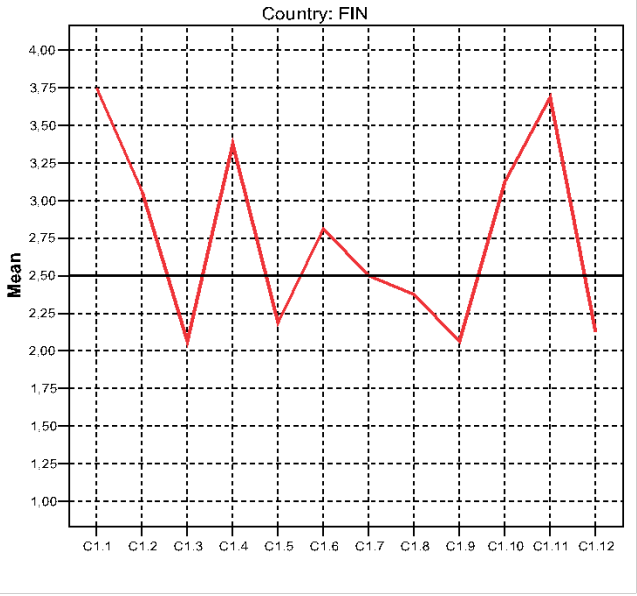
		C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9	C1.10	C1.11	C1.12
N	Valid	17	19	19	20	19	19	19	20	18	18	20	19
	Missing	3	1	1	0	1	1	1	0	2	2	0	1
Mean		3,76	3,21	2,11	3,50	2,26	2,89	2,47	2,45	2,06	3,11	3,70	2,21

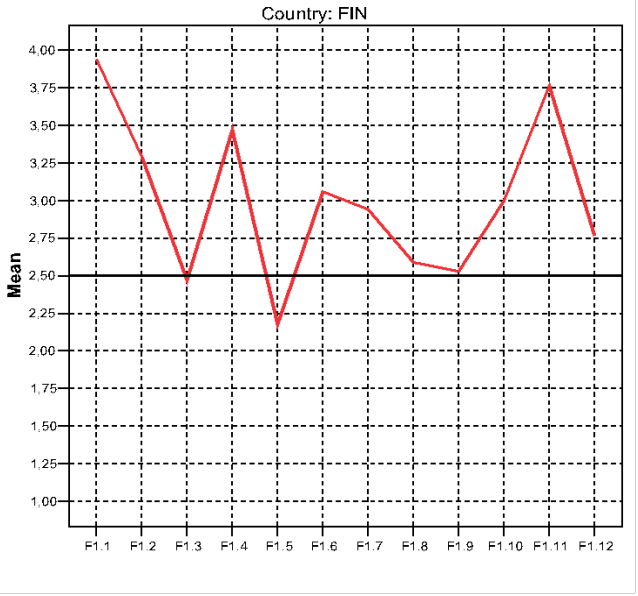
a. Country = FIN

Statistics[a]

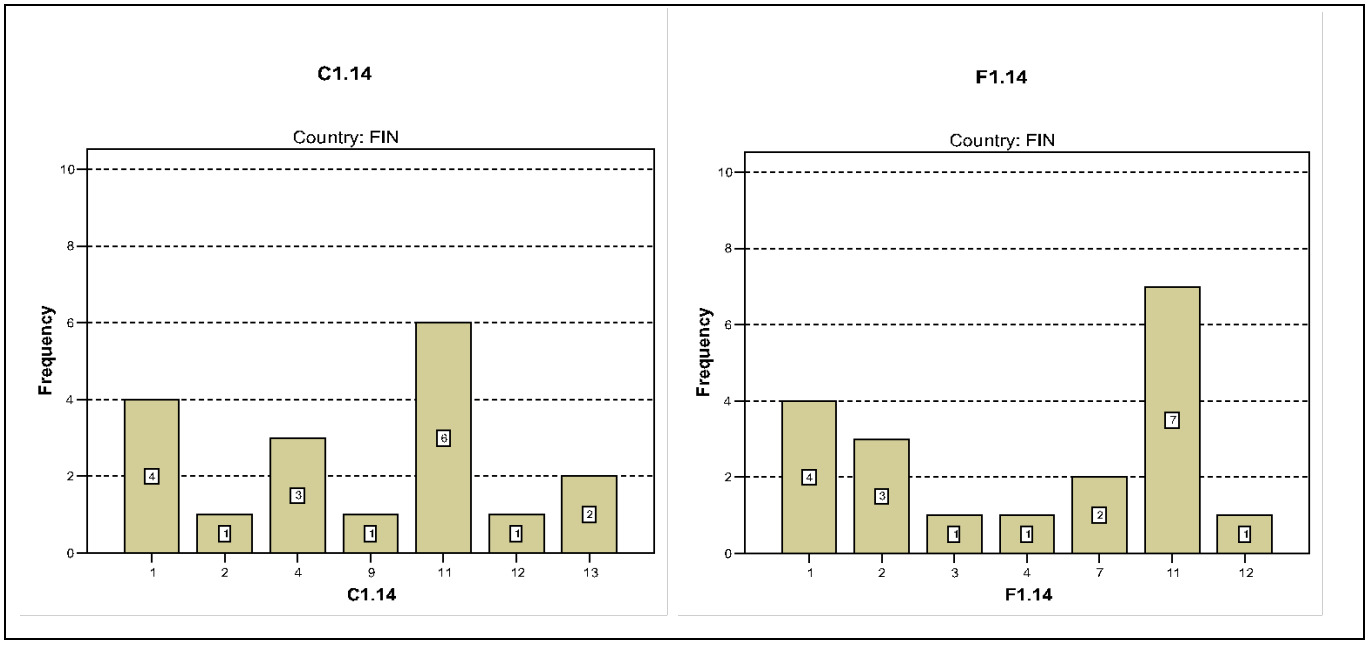
		F1.1	F1.2	F1.3	F1.4	F1.5	F1.6	F1.7	F1.8	F1.9	F1.10	F1.11	F1.12
N	Valid	17	19	19	20	19	19	19	20	19	19	20	19
	Missing	3	1	1	0	1	1	1	0	1	1	0	1
Mean		3,94	3,37	2,47	3,55	2,21	3,00	2,95	2,60	2,37	2,89	3,70	2,79

a. Country = FIN

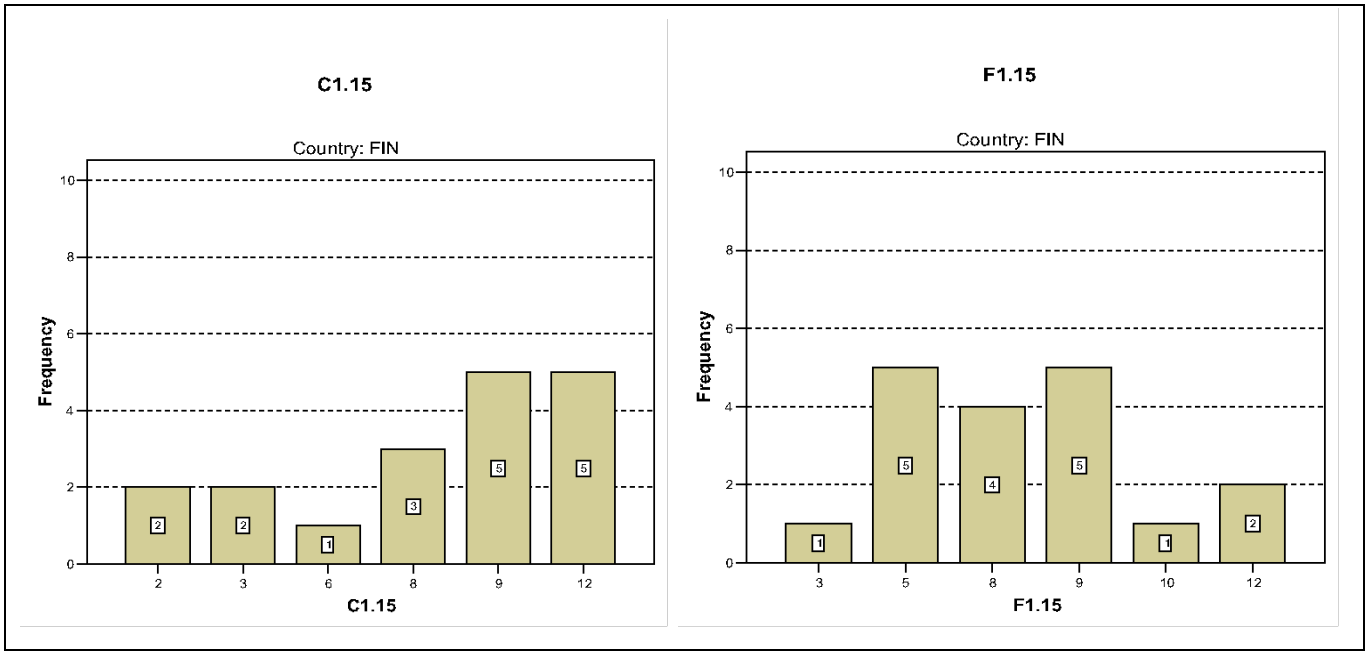




Single most important goal (C1.14) and single most important result (F1.14) of innovation in Finland



Single least important goal (C1.15) and single least important result (F1.15) of innovation in Finland



Means of Estonia for questions C1.1 – C1.12 (goals of innovation); F1.1 – F1.12 (results of innovation)

Statistics[a]

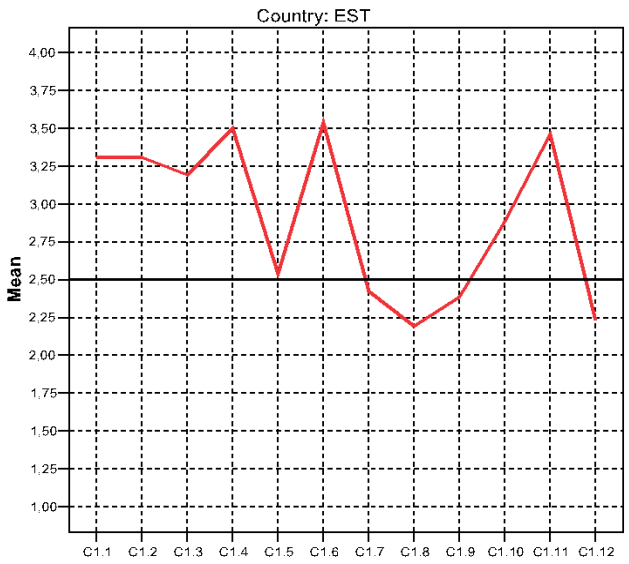
		C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9	C1.10	C1.11	C1.12
N	Valid	28	26	27	28	28	28	27	27	27	27	27	27
	Missing	0	2	1	0	0	0	1	1	1	1	1	1
Mean		3,32	3,31	3,19	3,46	2,57	3,57	2,44	2,22	2,41	2,89	3,48	2,22

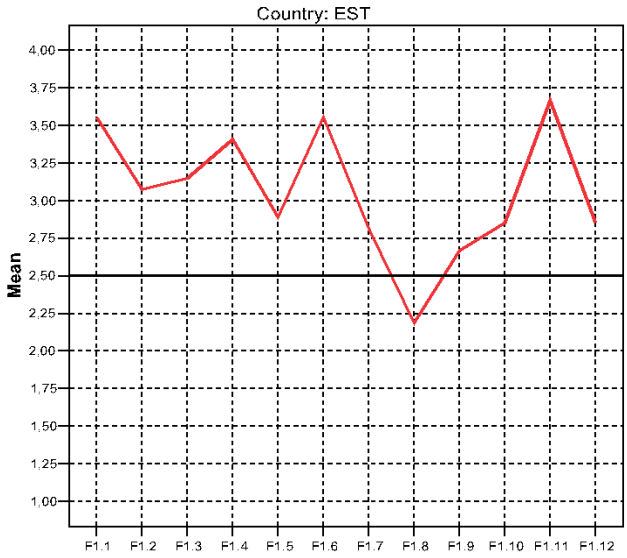
a. Country = EST

Statistics[a]

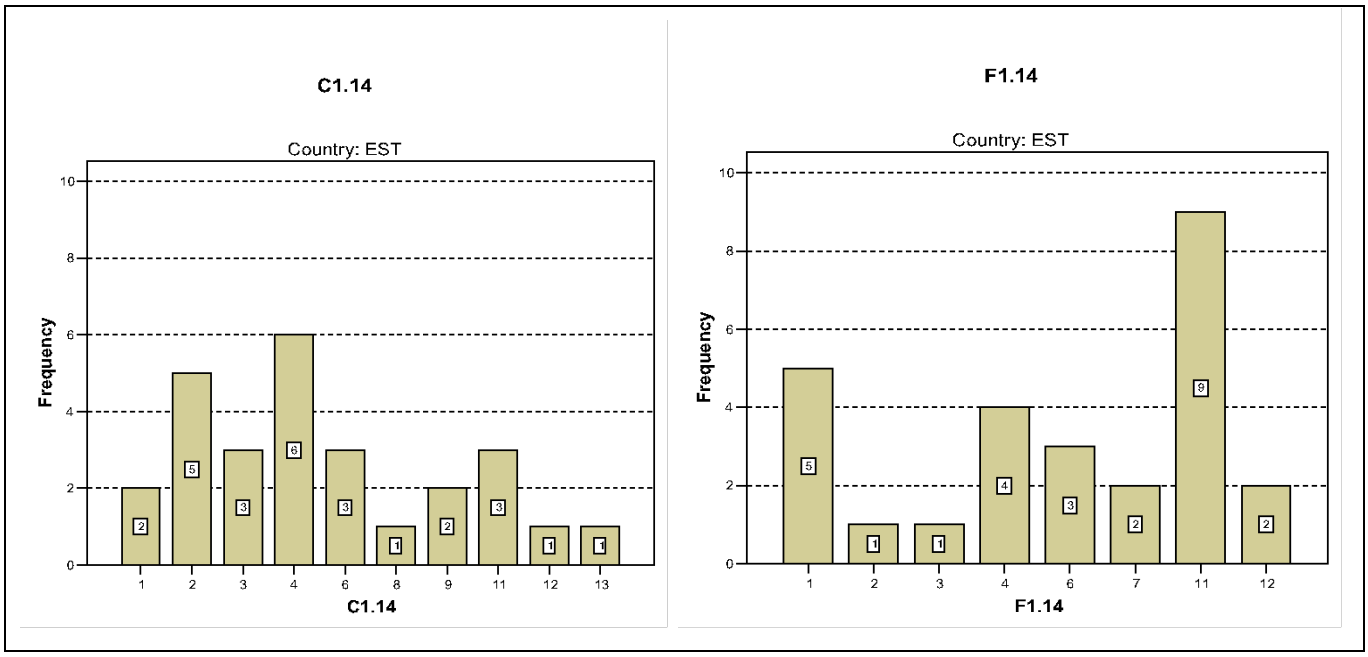
		F1.1	F1.2	F1.3	F1.4	F1.5	F1.6	F1.7	F1.8	F1.9	F1.10	F1.11	F1.12
N	Valid	28	28	28	28	28	28	28	27	28	28	28	28
	Missing	0	0	0	0	0	0	0	1	0	0	0	0
Mean		3,57	3,11	3,14	3,39	2,89	3,57	2,86	2,19	2,68	2,86	3,68	2,86

a. Country = EST

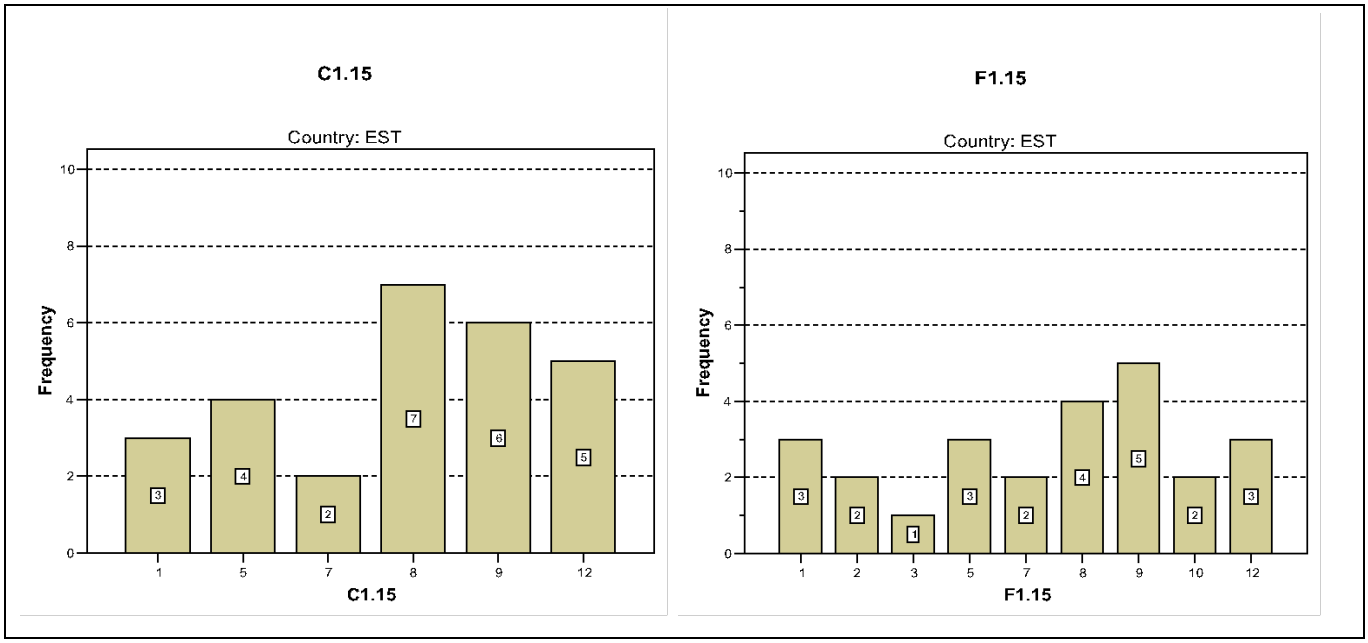




Single most important goal (C1.14) and single most important result (F1.14) of innovation in Estonia



Single least important goal (C1.15) and single least important result (F1.15) of innovation in Estonia



Annex 6 – Internal and external supporting factors of innovation (D)

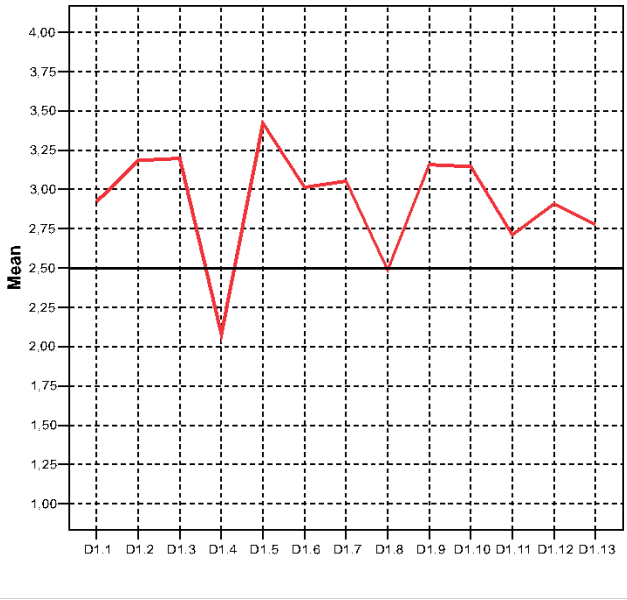
Means of total sample for questions D1.1 – D1.13 (internal supporters of innovation); D2.1 – D2.12 (external supporters of innovation)

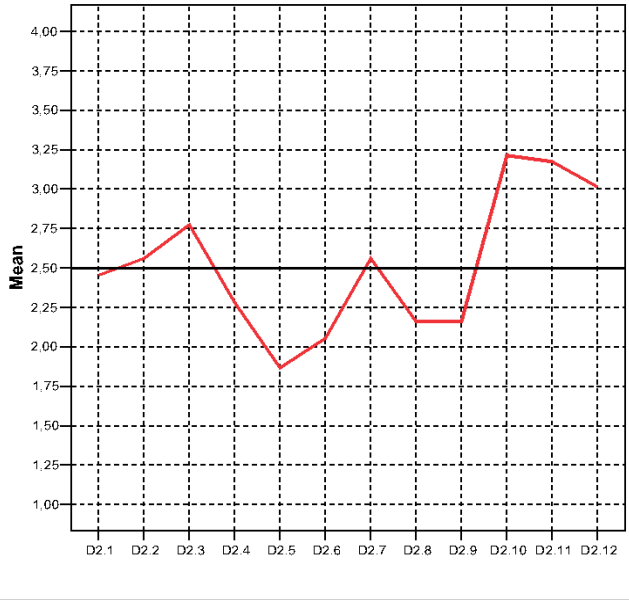
Statistics

		D1.1	D1.2	D1.3	D1.4	D1.5	D1.6	D1.7	D1.8	D1.9	D1.10	D1.11	D1.12	D1.13
N	Valid	76	78	78	77	78	78	79	78	79	79	79	79	79
	Missing	5	3	3	4	3	3	2	3	2	2	2	2	2
Mean		2,92	3,19	3,19	2,06	3,42	3,01	3,05	2,49	3,16	3,16	2,73	2,94	2,77

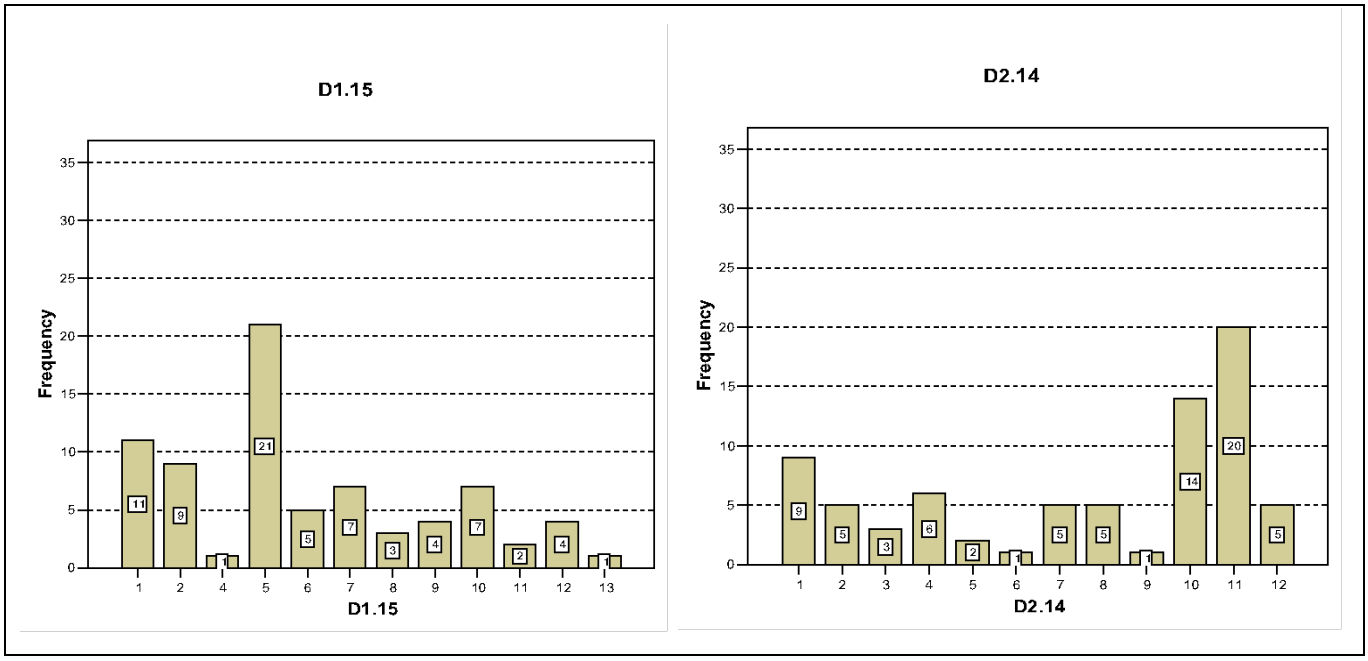
Statistics

		D2.1	D2.2	D2.3	D2.4	D2.5	D2.6	D2.7	D2.8	D2.9	D2.10	D2.11	D2.12
N	Valid	78	78	76	76	76	77	77	77	76	79	79	76
	Missing	3	3	5	5	5	4	4	4	5	2	2	5
Mean		2,49	2,58	2,79	2,26	1,86	2,09	2,57	2,18	2,14	3,25	3,18	3,03

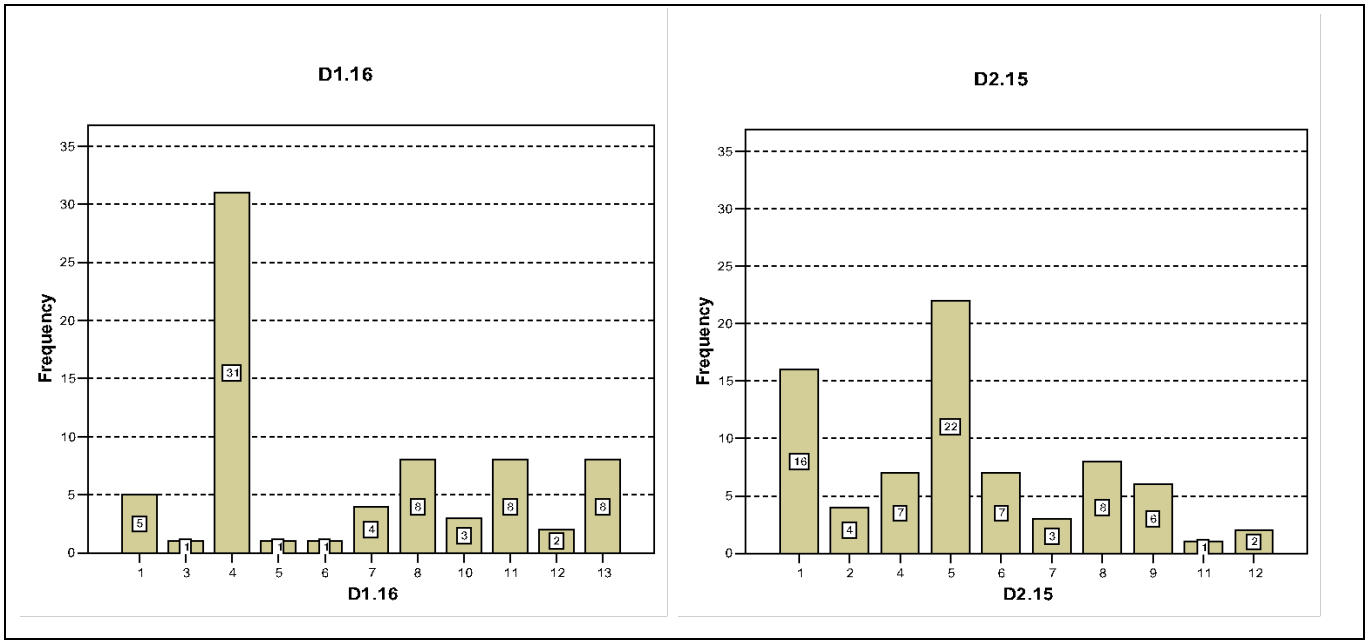




Single most important internal supporting factor (D1.15) and single most important external supporting factor (D2.14) of innovation in total sample



Single least important internal supporting factor (D1.16) and single least important external supporting factor (D2.15) of innovation in total sample



Means of the UK for questions D1.1 – D1.13 (internal supporters of innovation); D2.1 – D2.12 (external supporters of innovation)

Statistics[a]

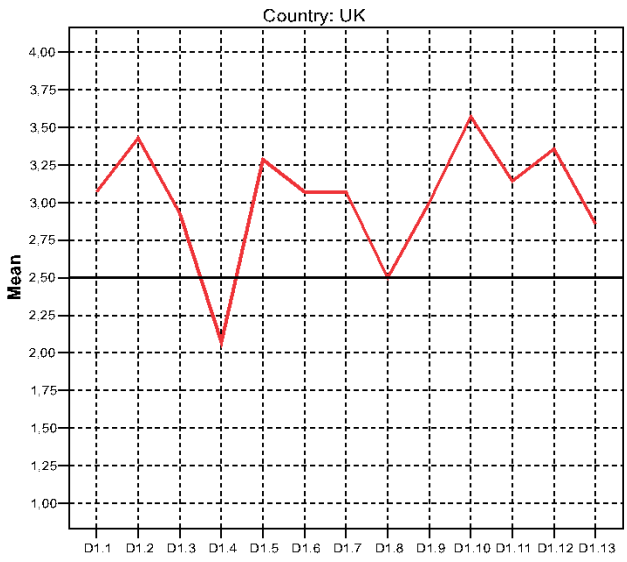
		D1.1	D1.2	D1.3	D1.4	D1.5	D1.6	D1.7	D1.8	D1.9	D1.10	D1.11	D1.12	D1.13
N	Valid	14	15	15	14	15	15	15	15	15	15	15	15	15
	Missing	1	0	0	1	0	0	0	0	0	0	0	0	0
Mean		3,07	3,47	2,93	2,07	3,27	3,07	3,00	2,53	3,07	3,60	3,20	3,40	2,80

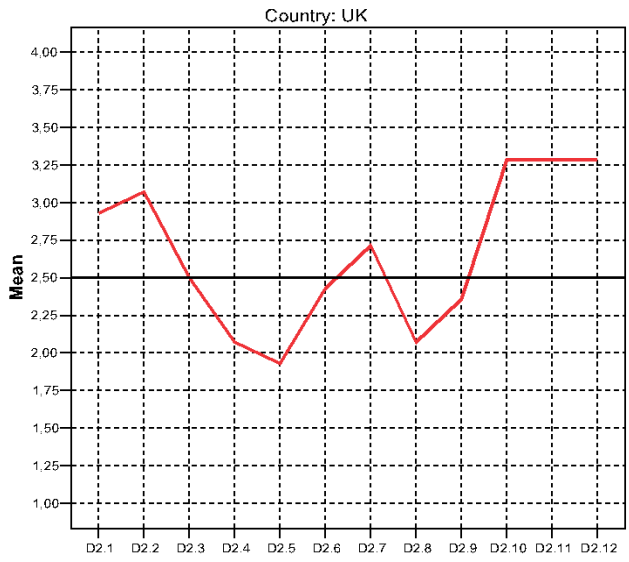
a. Country = UK

Statistics[a]

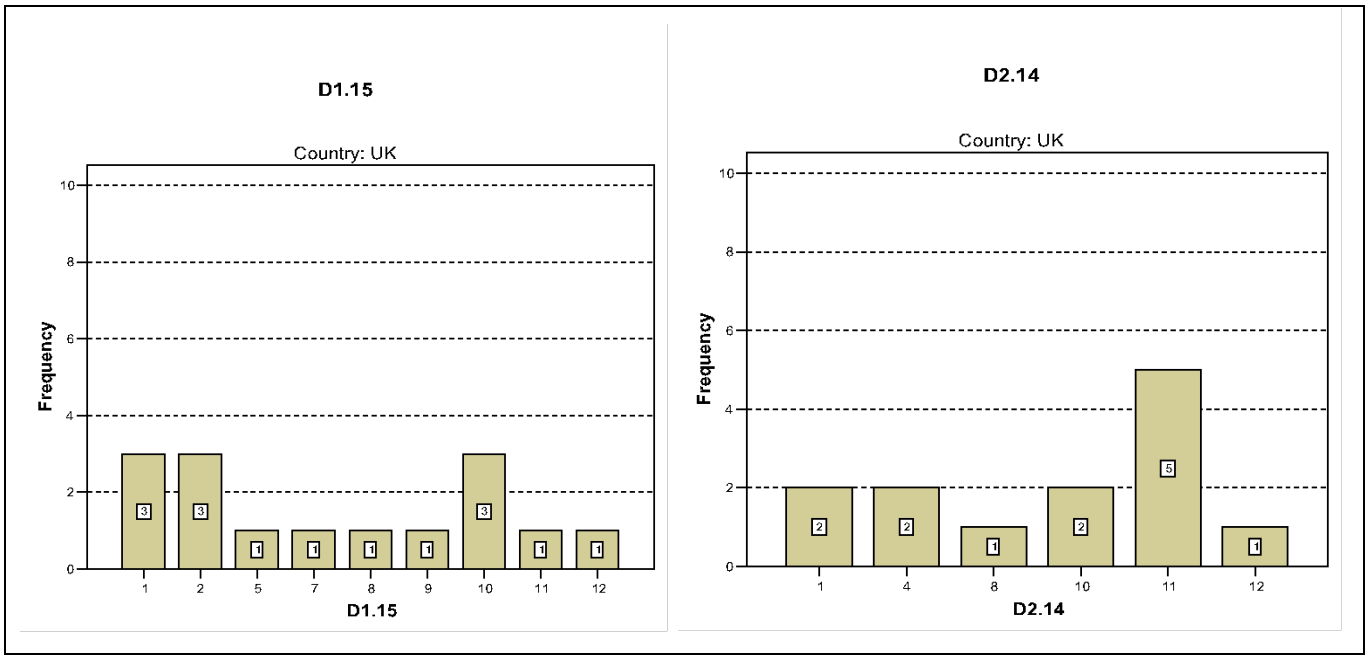
		D2.1	D2.2	D2.3	D2.4	D2.5	D2.6	D2.7	D2.8	D2.9	D2.10	D2.11	D2.12
N	Valid	15	15	15	14	14	15	14	14	14	15	15	14
	Missing	0	0	0	1	1	0	1	1	1	0	0	1
Mean		3,00	3,13	2,60	2,07	1,93	2,47	2,71	2,07	2,36	3,33	3,33	3,29

a. Country = UK

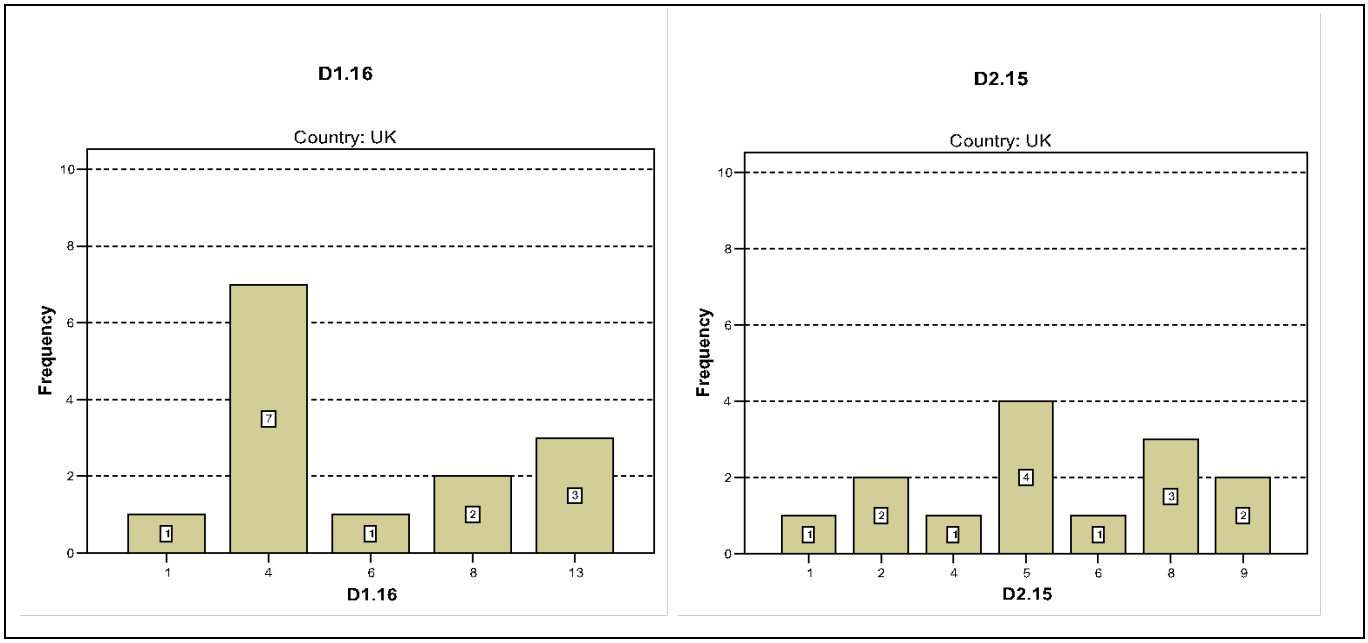




Single most important internal supporting factor (D1.15) and single most important external supporting factor (D2.14) of innovation in the UK



Single least important internal supporting factor (D1.16) and single least important external supporting factor (D2.15) of innovation in the UK



Means of Denmark for questions D1.1 – D1.13 (internal supporters of innovation); D2.1 – D2.12 (external supporters of innovation)

Statistics[a]

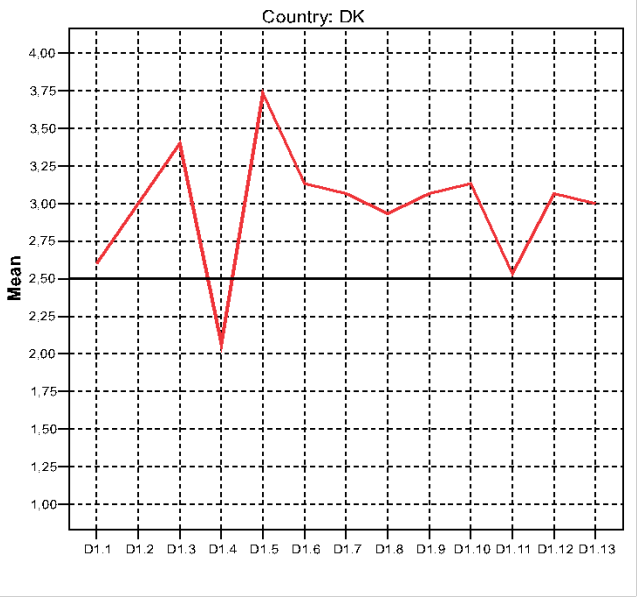
		D1.1	D1.2	D1.3	D1.4	D1.5	D1.6	D1.7	D1.8	D1.9	D1.10	D1.11	D1.12	D1.13
N	Valid	15	16	16	16	15	16	17	16	17	17	17	17	17
	Missing	3	2	2	2	3	2	1	2	1	1	1	1	1
Mean		2,60	3,00	3,38	2,00	3,73	3,13	3,12	2,88	3,06	3,18	2,59	3,12	3,00

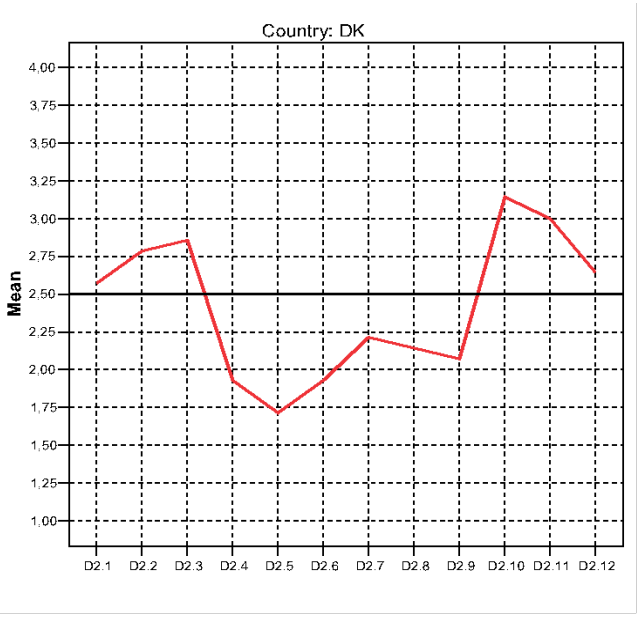
a. Country = DK

Statistics[a]

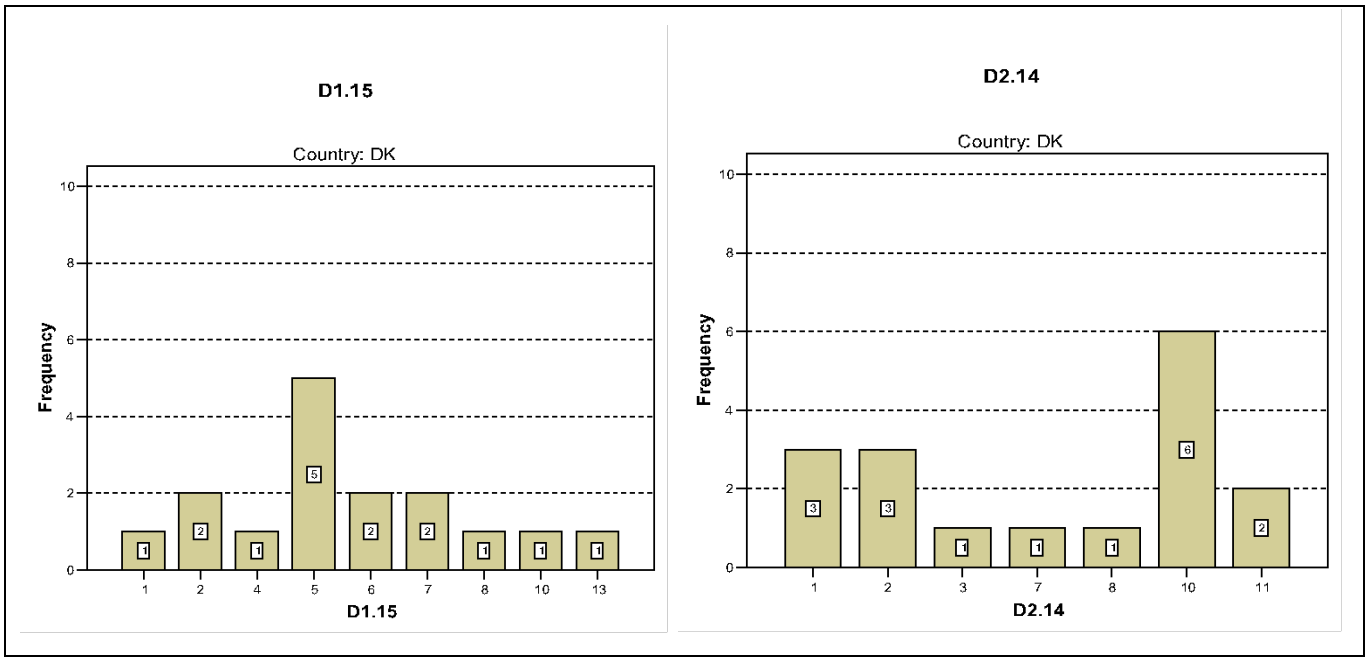
		D2.1	D2.2	D2.3	D2.4	D2.5	D2.6	D2.7	D2.8	D2.9	D2.10	D2.11	D2.12
N	Valid	16	16	14	15	15	15	16	16	15	17	16	15
	Missing	2	2	4	3	3	3	2	2	3	1	2	3
Mean		2,63	2,75	2,86	1,87	1,67	2,07	2,31	2,25	2,00	3,29	2,94	2,73

a. Country = DK

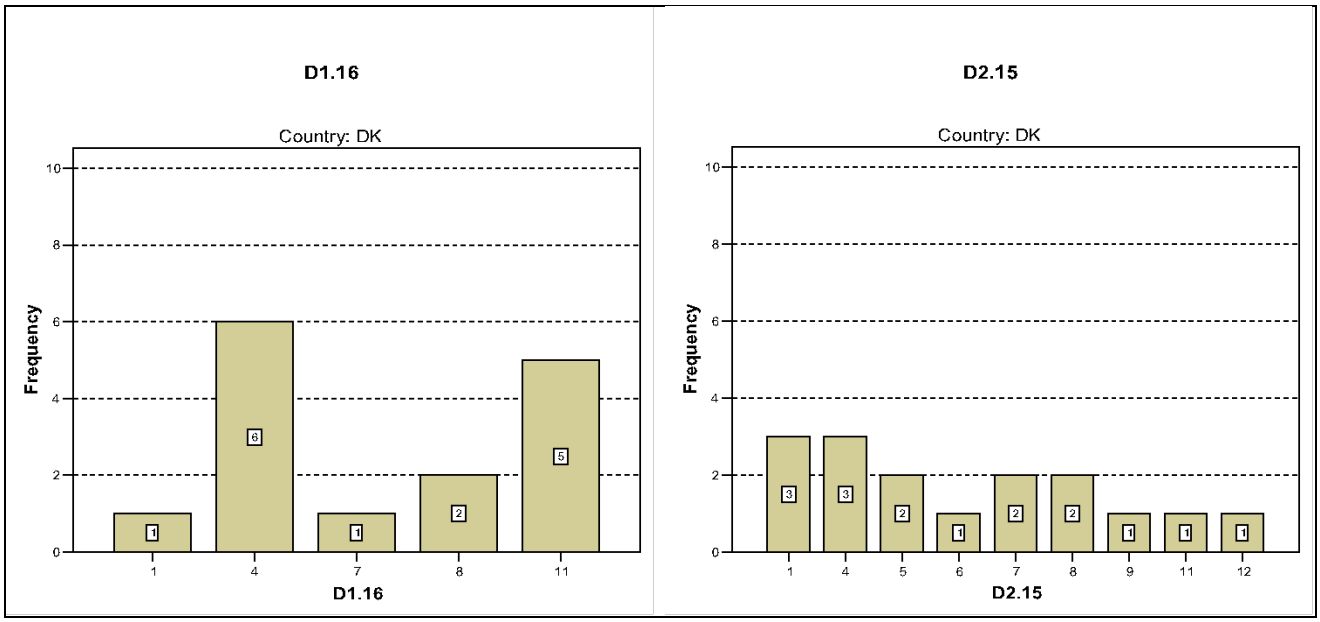




Single most important internal supporting factor (D1.15) and single most important external supporting factor (D2.14) of innovation in Denmark



Single least important internal supporting factor (D1.16) and single least important external supporting factor (D2.15) of innovation in Denmark



Means of Finland for questions D1.1 – D1.13 (internal supporters of innovation); D2.1 – D2.12 (external supporters of innovation)

Statistics[a]

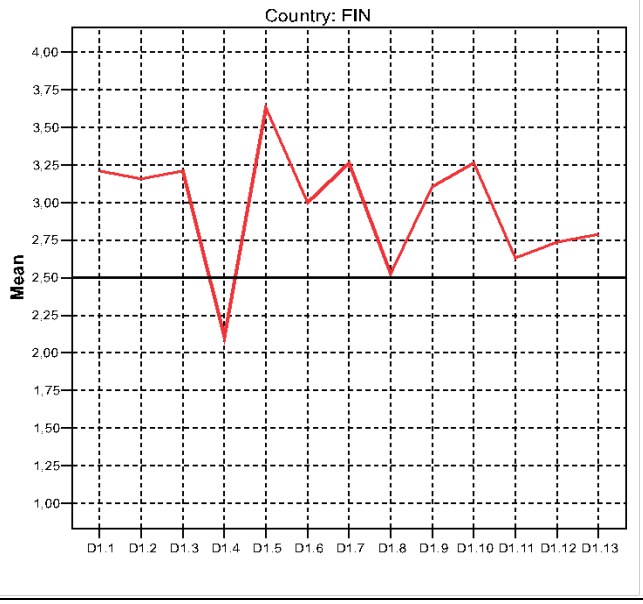
		D1.1	D1.2	D1.3	D1.4	D1.5	D1.6	D1.7	D1.8	D1.9	D1.10	D1.11	D1.12	D1.13
N	Valid	19	19	19	19	20	19	19	19	19	19	19	19	19
	Missing	1	1	1	1	0	1	1	1	1	1	1	1	1
Mean		3,21	3,16	3,21	2,11	3,65	3,00	3,26	2,53	3,11	3,26	2,63	2,74	2,79

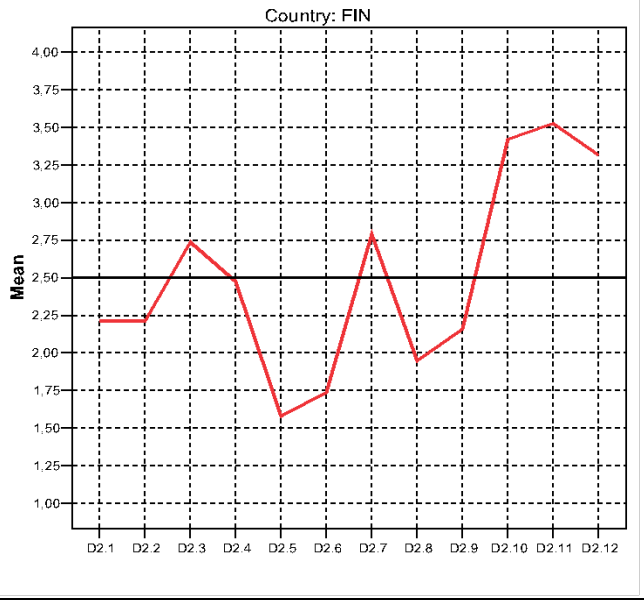
a. Country = FIN

Statistics[a]

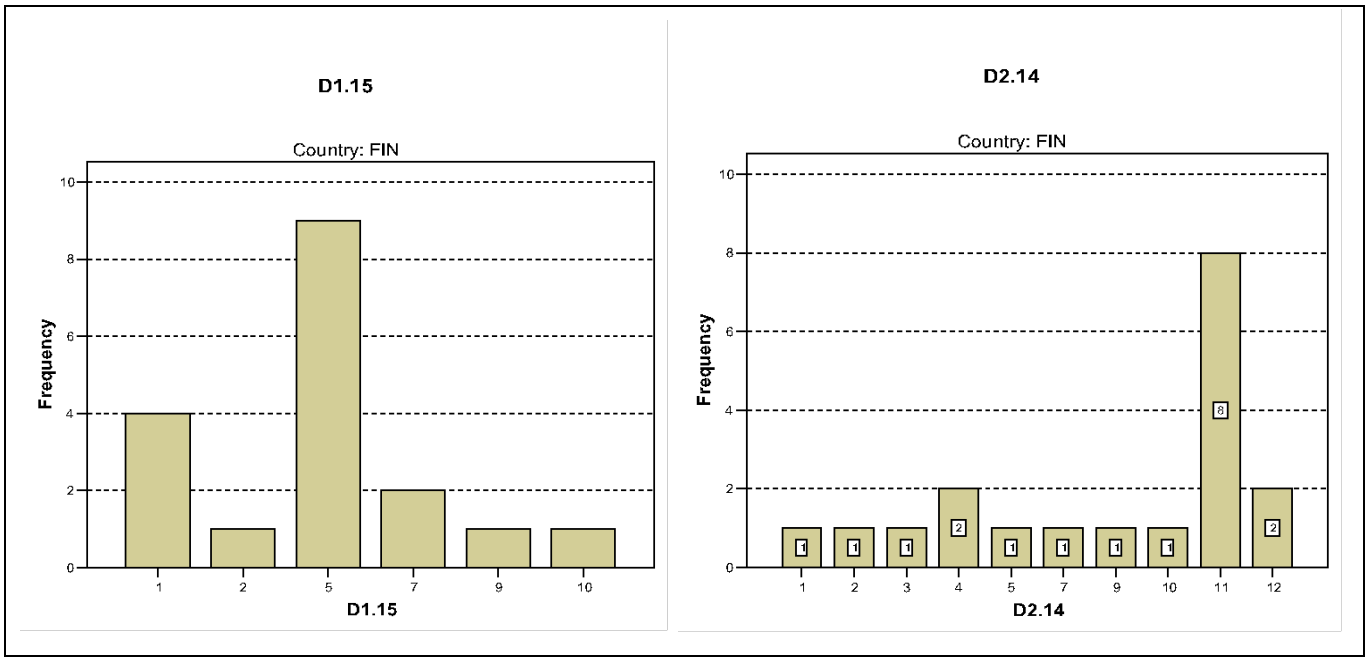
		D2.1	D2.2	D2.3	D2.4	D2.5	D2.6	D2.7	D2.8	D2.9	D2.10	D2.11	D2.12
N	Valid	19	19	19	19	19	19	19	19	19	19	20	19
	Missing	1	1	1	1	1	1	1	1	1	1	0	1
Mean		2,21	2,21	2,74	2,47	1,58	1,74	2,79	1,95	2,16	3,42	3,55	3,32

a. Country = FIN

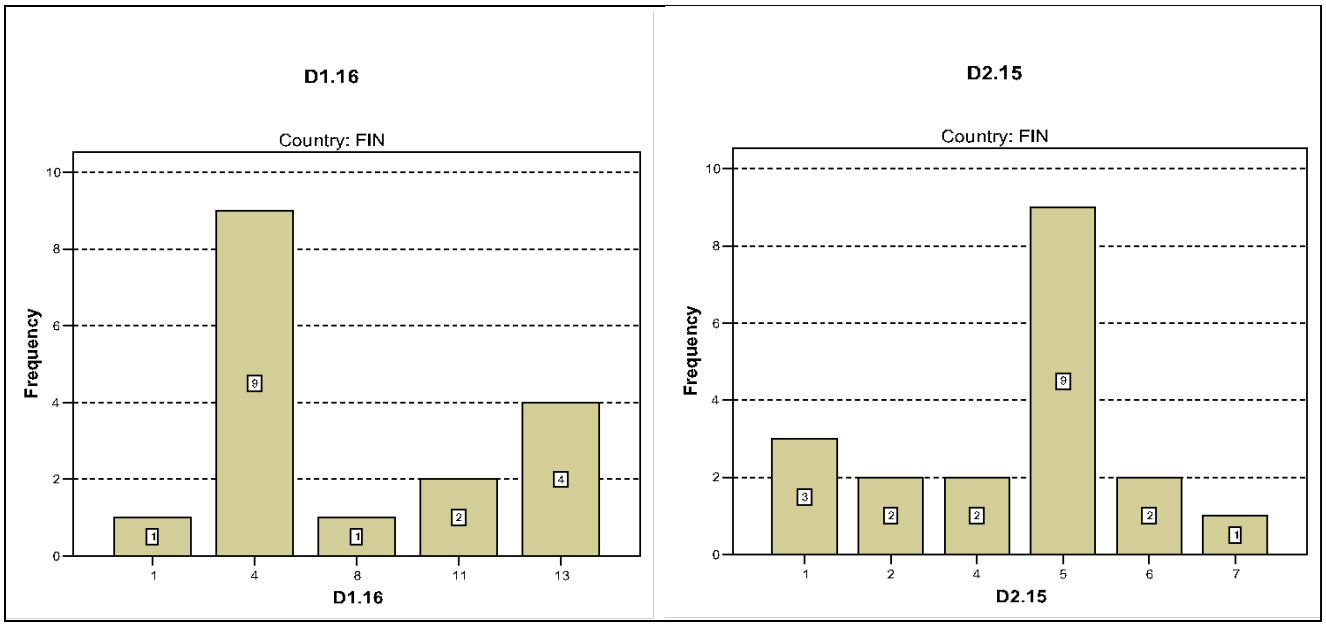




Single most important internal supporting factor (D1.15) and single most important external supporting factor (D2.14) of innovation in Finland



Single least important internal supporting factor (D1.16) and single least important external supporting factor (D2.15) of innovation in Finland



Means of Estonia for questions D1.1 – D1.13 (internal supporters of innovation); D2.1 – D2.12 (external supporters of innovation)

Statistics[a]

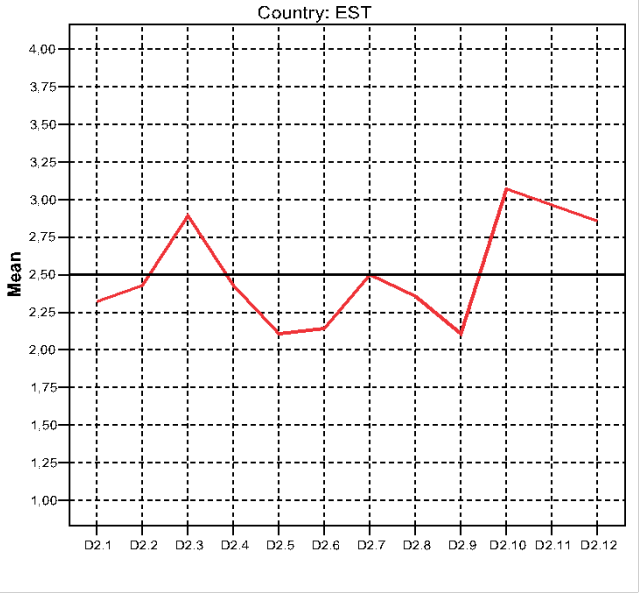
		D1.1	D1.2	D1.3	D1.4	D1.5	D1.6	D1.7	D1.8	D1.9	D1.10	D1.11	D1.12	D1.13
N	Valid	28	28	28	28	28	28	28	28	28	28	28	28	28
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean		2,82	3,18	3,21	2,07	3,18	2,93	2,89	2,21	3,32	2,86	2,64	2,71	2,61

a. Country = EST

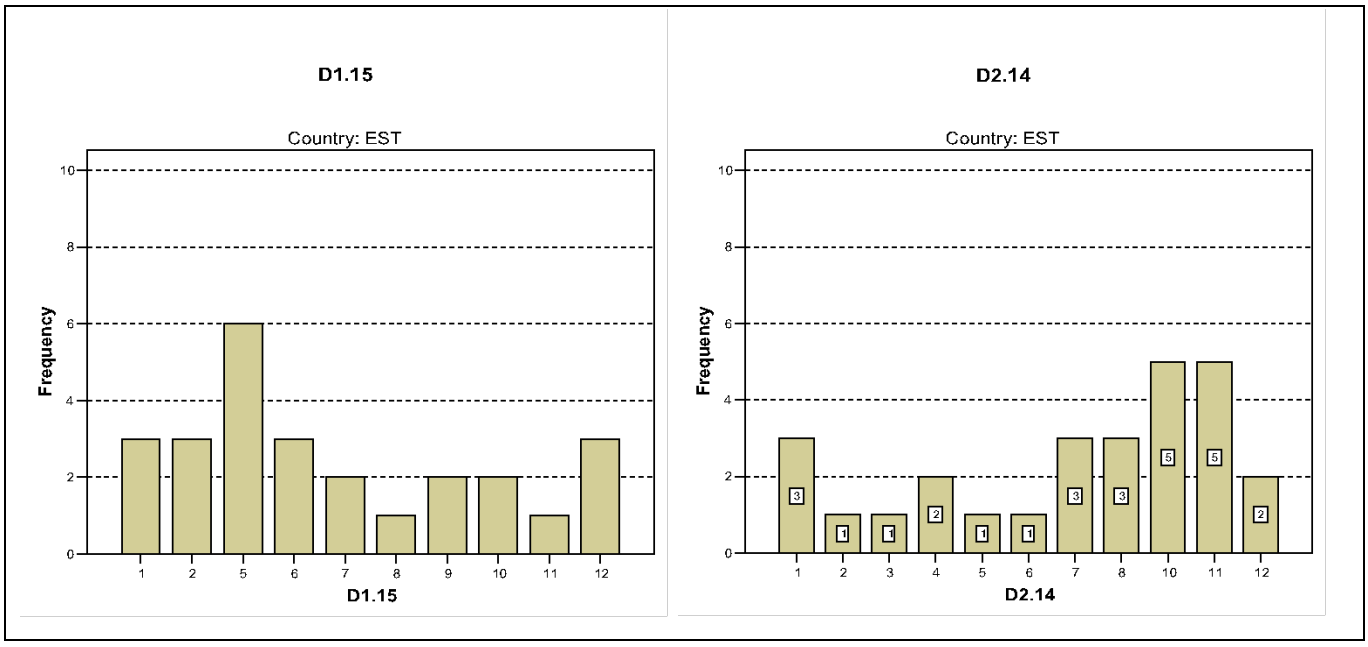
Statistics[a]

		D2.1	D2.2	D2.3	D2.4	D2.5	D2.6	D2.7	D2.8	D2.9	D2.10	D2.11	D2.12
N	Valid	28	28	28	28	28	28	28	28	28	28	28	28
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		2,32	2,43	2,89	2,43	2,11	2,14	2,50	2,36	2,11	3,07	2,96	2,86

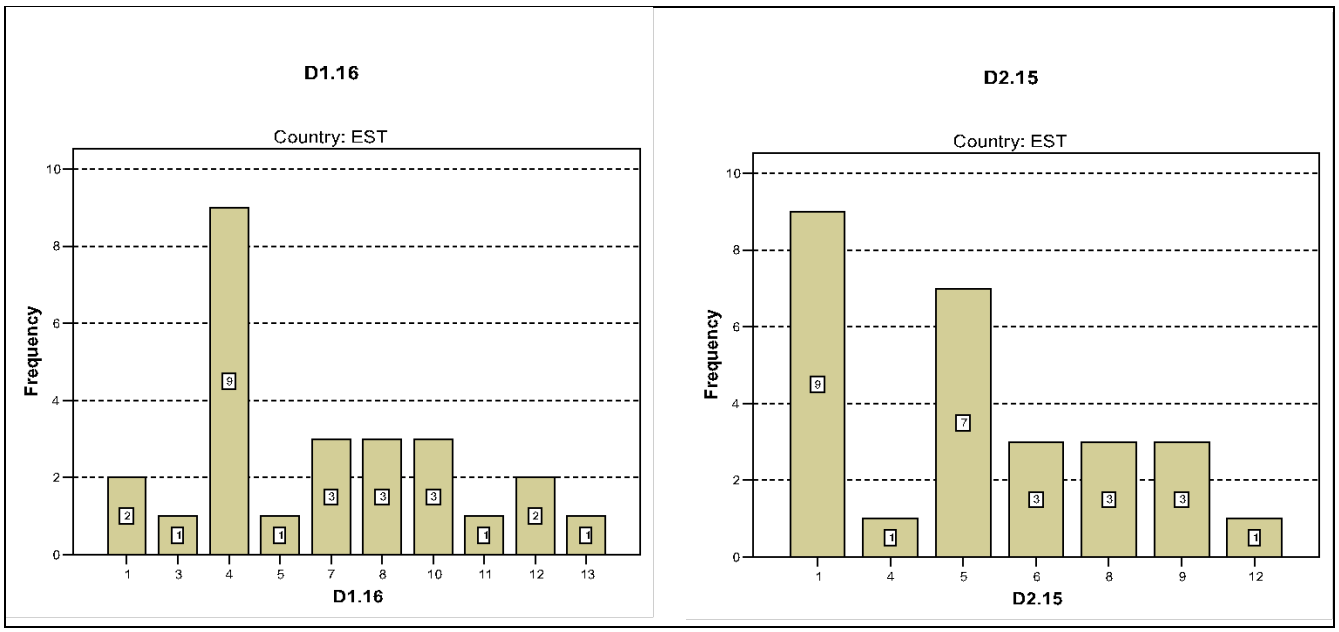
a. Country = EST



Single most important internal supporting factor (D1.15) and single most important external supporting factor (D2.14) of innovation in Estonia



Single least important internal supporting factor (D1.16) and single least important external supporting factor (D2.15) of innovation in Estonia



Annex 7 – Internal and external hampering factors of innovation (E)

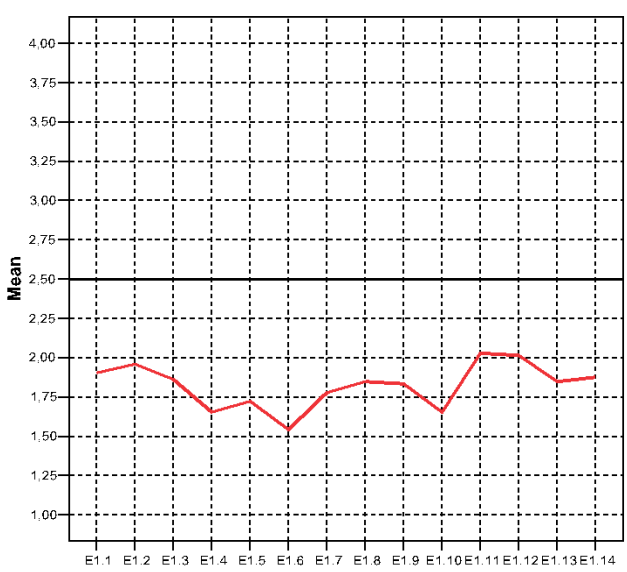
Means of total sample for questions E1.1 – E1.14 (internal obstacles of innovation); E2.1 – E2.12 (external obstacles of innovation)

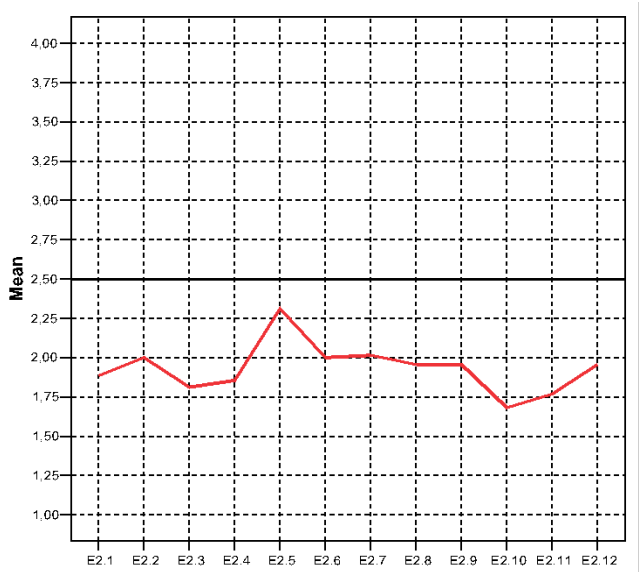
Statistics

		E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7	E1.8	E1.9	E1.10	E1.11	E1.12	E1.13	E1.14
N	Valid	74	75	73	74	72	73	74	74	74	73	74	74	74	74
	Missing	7	6	8	7	9	8	7	7	7	8	7	7	7	7
Mean		1,91	1,97	1,86	1,65	1,72	1,56	1,81	1,86	1,85	1,66	2,05	2,03	1,86	1,89

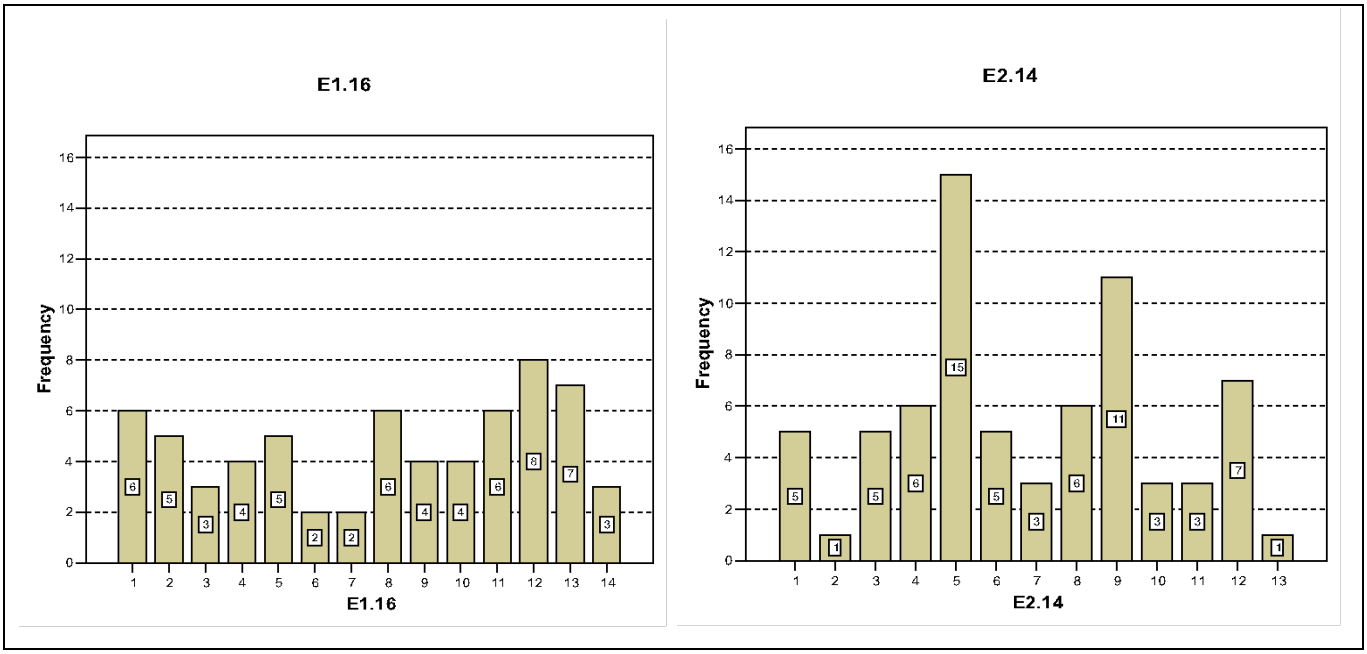
Statistics

		E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E2.9	E2.10	E2.11	E2.12
N	Valid	74	74	75	74	75	75	74	75	75	75	74	73
	Missing	7	7	6	7	6	6	7	6	6	6	7	8
Mean		1,85	1,96	1,83	1,85	2,35	2,01	2,04	1,99	2,01	1,73	1,81	1,99

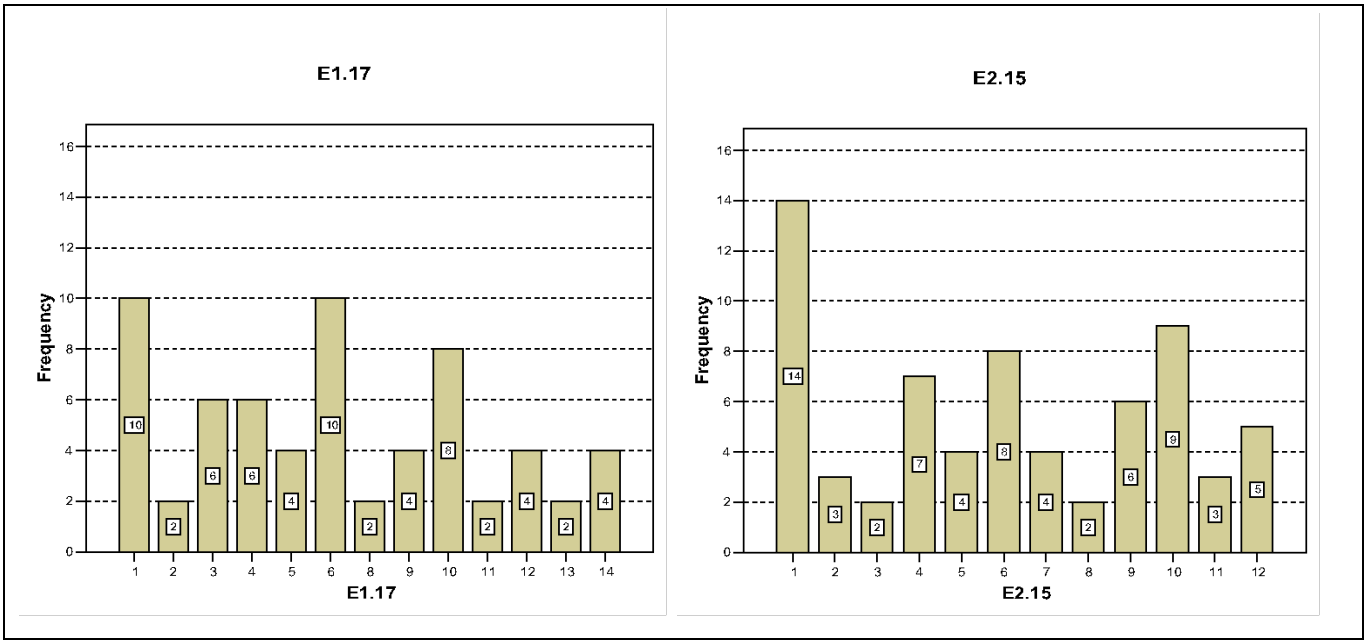




Single most important internal obstacle (E1.16) and single most important external obstacle (E2.14) of innovation in total sample



Single least important internal obstacle (E1.17) and single least important external obstacle (E2.15) of innovation in total sample



Means of the UK for questions E1.1 – E1.14 (internal obstacles of innovation); E2.1 – E2.12 (external obstacles of innovation)

Statistics[a]

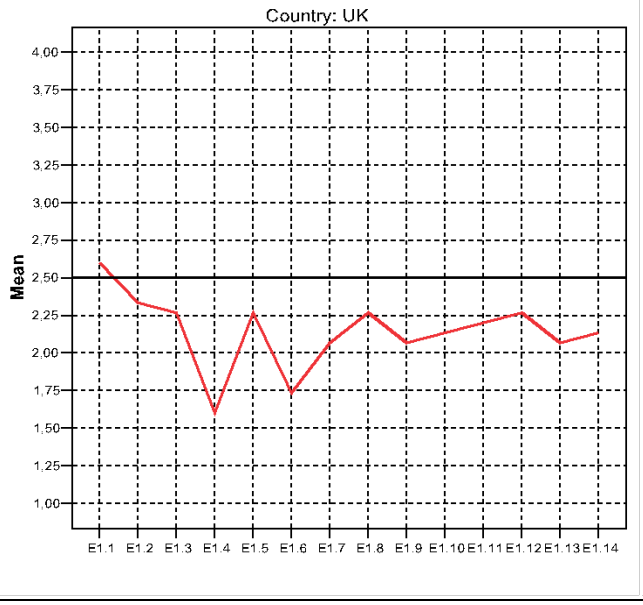
		E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7	E1.8	E1.9	E1.10	E1.11	E1.12	E1.13	E1.14
N	Valid	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean		2,60	2,33	2,27	1,60	2,27	1,73	2,07	2,27	2,07	2,13	2,20	2,27	2,07	2,13

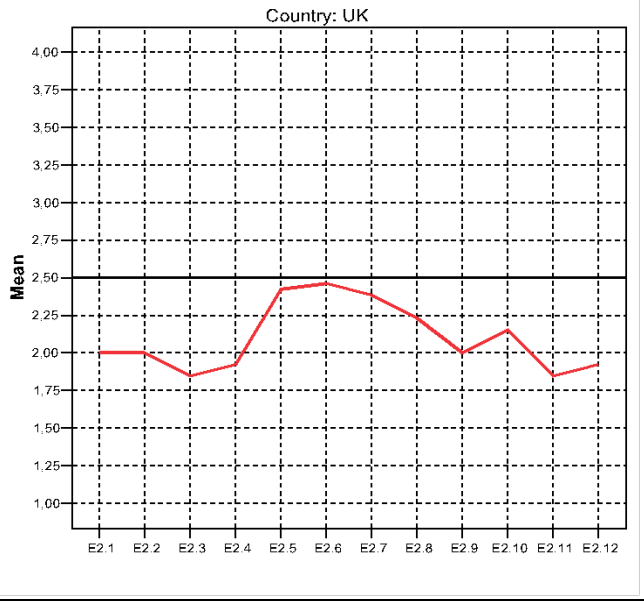
a. Country = UK

Statistics[a]

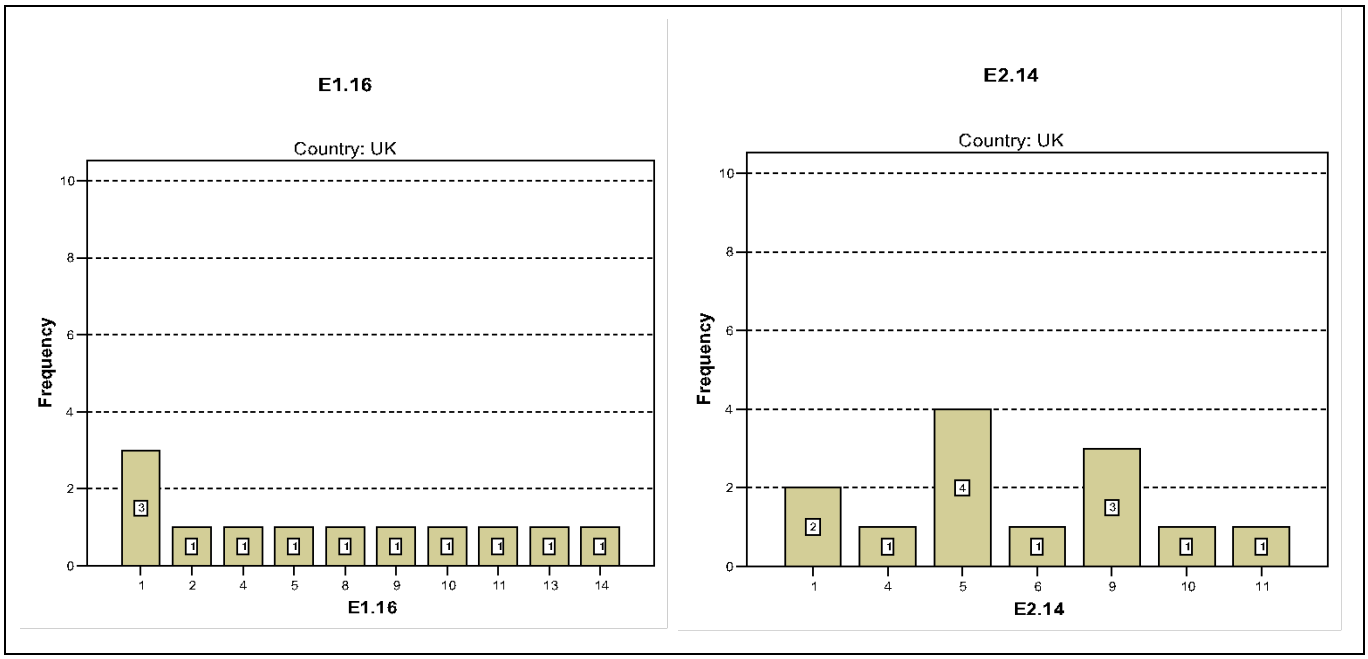
		E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E2.9	E2.10	E2.11	E2.12
N	Valid	15	15	15	15	15	15	14	15	14	15	15	15
	Missing	0	0	0	0	0	0	1	0	1	0	0	0
Mean		1,93	1,87	1,73	1,87	2,50	2,53	2,36	2,20	2,07	2,13	1,87	1,93

a. Country = UK

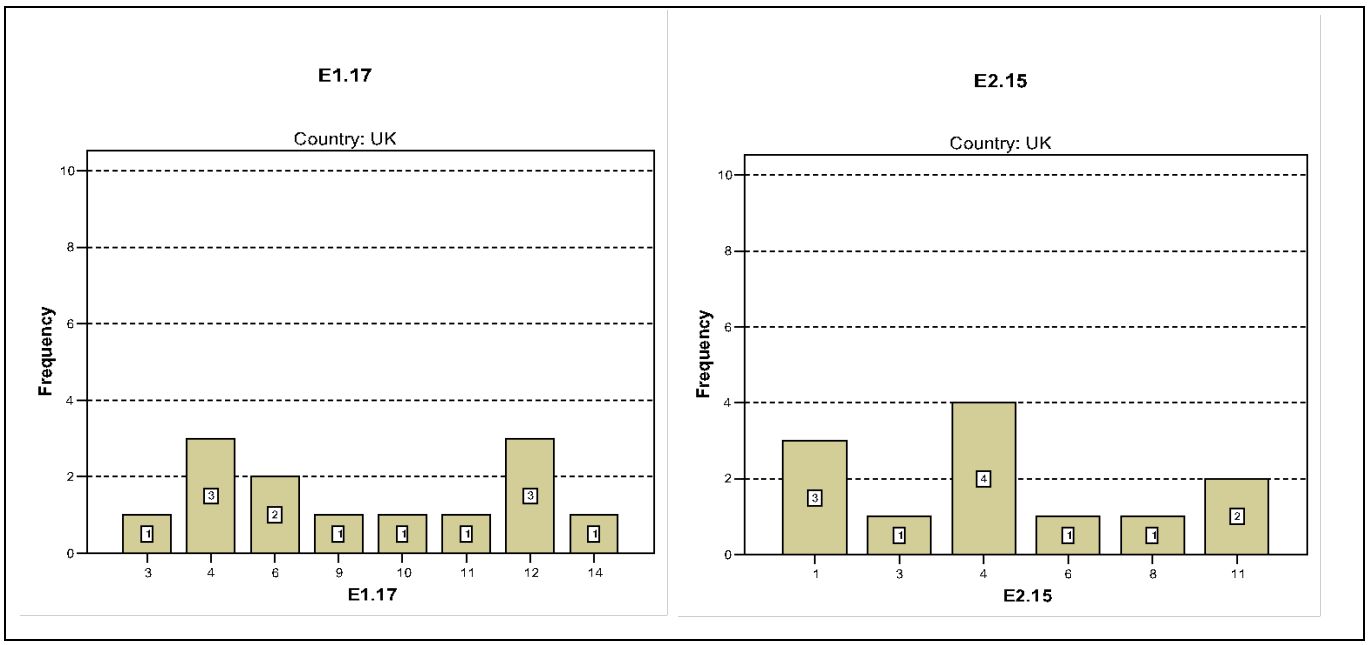




Single most important internal obstacle (E1.16) and single most important external obstacle (E2.14) of innovation in the UK



Single least important internal obstacle (E1.17) and single least important external obstacle (E2.15) of innovation in the UK



Means of Denmark for questions E1.1 – E1.14 (internal obstacles of innovation); E2.1 – E2.12 (external obstacles of innovation)

Statistics[a]

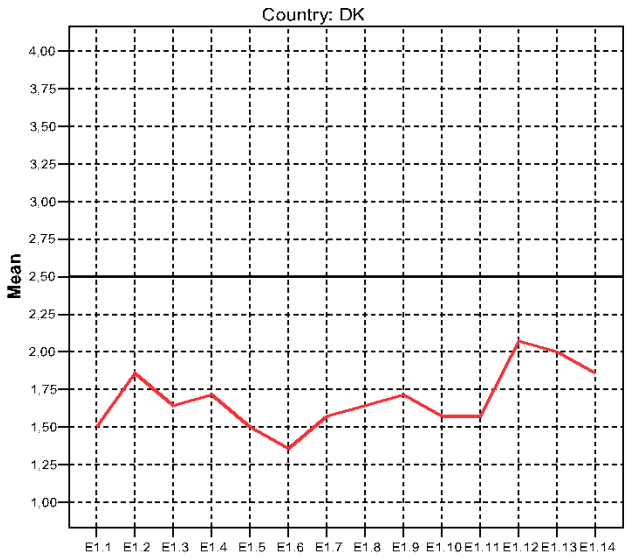
		E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7	E1.8	E1.9	E1.10	E1.11	E1.12	E1.13	E1.14
N	Valid	14	15	14	14	14	14	14	14	15	15	14	14	14	14
	Missing	4	3	4	4	4	4	4	4	3	3	4	4	4	4
Mean		1,50	1,87	1,64	1,71	1,50	1,36	1,57	1,64	1,80	1,60	1,57	2,07	2,00	1,86

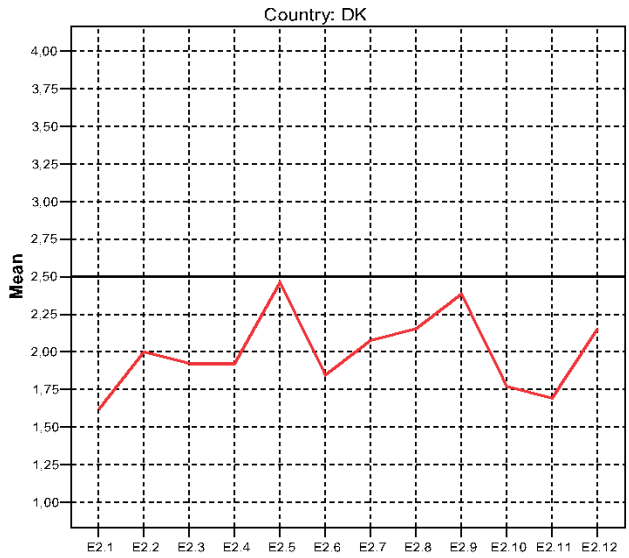
a. Country = DK

Statistics[a]

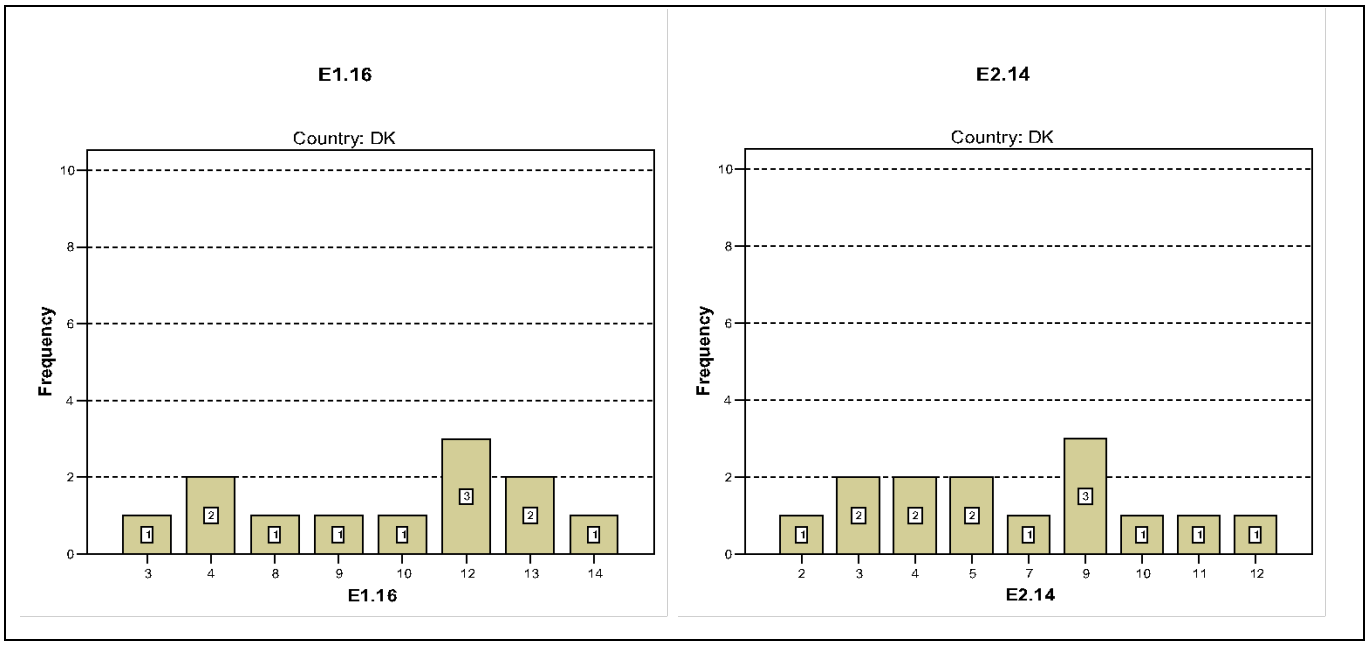
		E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E2.9	E2.10	E2.11	E2.12
N	Valid	14	14	15	14	14	14	14	14	15	15	14	14
	Missing	4	4	3	4	4	4	4	4	3	3	4	4
Mean		1,64	2,00	2,07	1,93	2,43	1,86	2,14	2,14	2,33	1,87	1,79	2,21

a. Country = DK

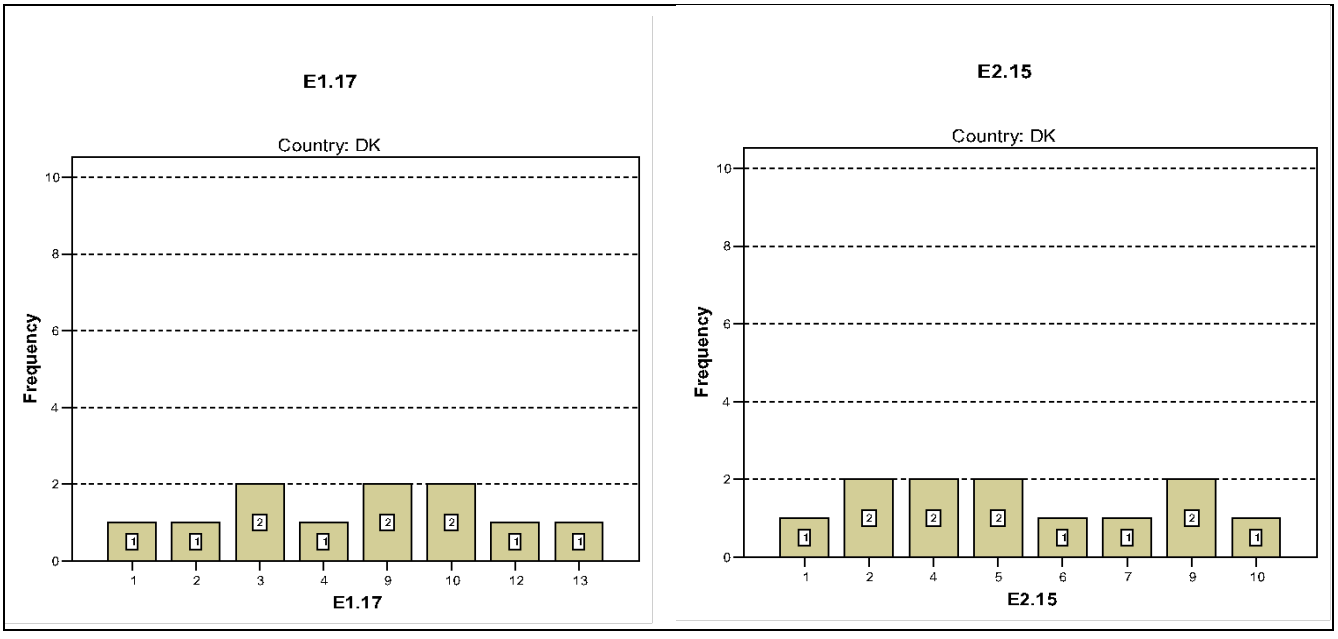




Single most important internal obstacle (E1.16) and single most important external obstacle (E2.14) of innovation in Denmark



Single least important internal obstacle (E1.17) and single least important external obstacle (E2.15) of innovation in Denmark



Means of Finland for questions E1.1 – E1.14 (internal obstacles of innovation); E2.1 – E2.12 (external obstacles of innovation)

Statistics[a]

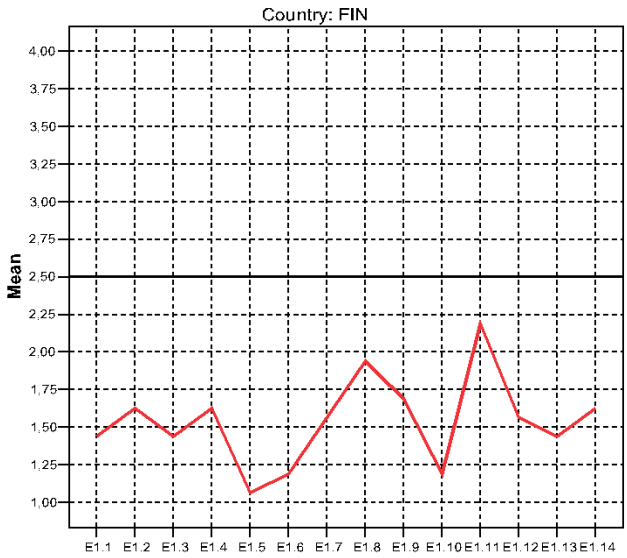
		E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7	E1.8	E1.9	E1.10	E1.11	E1.12	E1.13	E1.14
N	Valid	17	17	16	17	16	16	17	17	16	16	17	17	17	17
	Missing	3	3	4	3	4	4	3	3	4	4	3	3	3	3
Mean		1,53	1,71	1,44	1,65	1,06	1,19	1,65	2,00	1,69	1,19	2,24	1,65	1,47	1,71

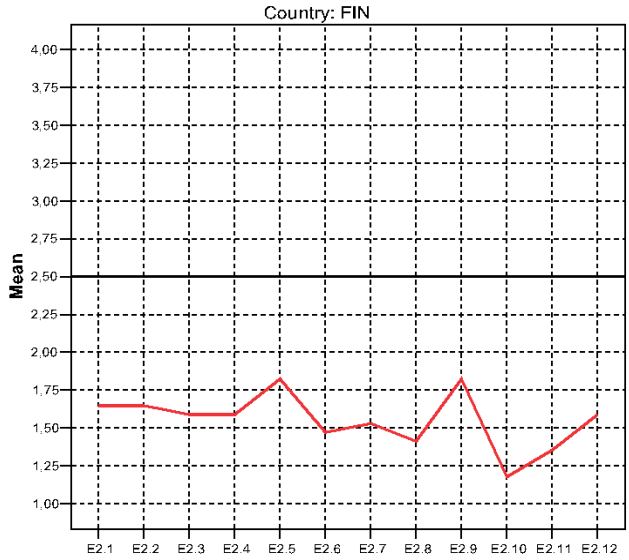
a. Country = FIN

Statistics[a]

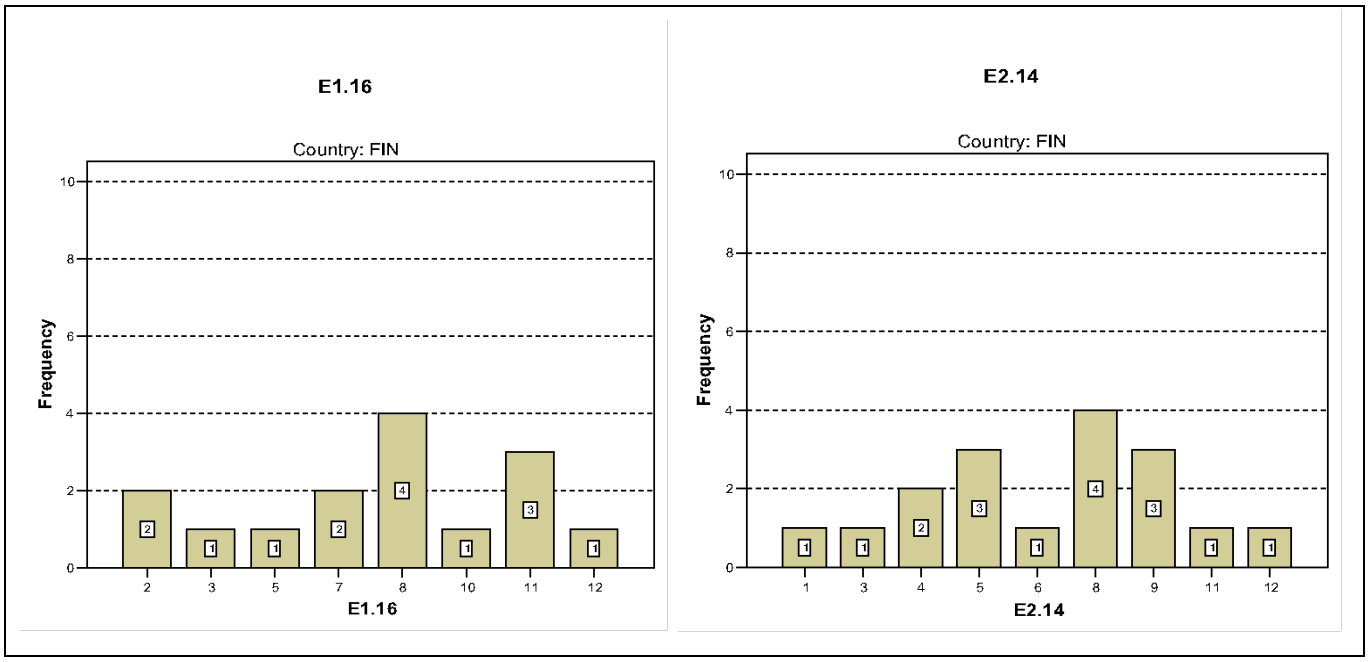
		E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E2.9	E2.10	E2.11	E2.12
N	Valid	17	17	17	17	18	18	18	18	18	17	17	18
	Missing	3	3	3	3	2	2	2	2	2	3	3	2
Mean		1,65	1,65	1,59	1,59	1,89	1,50	1,61	1,50	1,89	1,18	1,35	1,67

a. Country = FIN

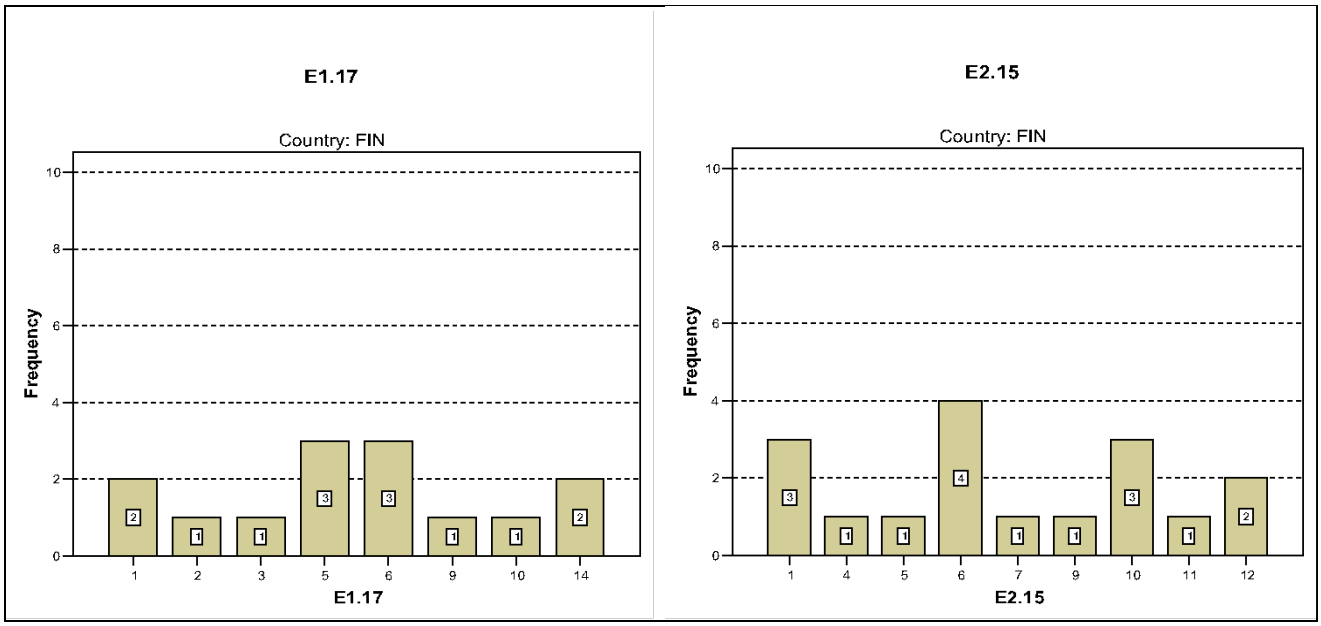




Single most important internal obstacle (E1.16) and single most important external obstacle (E2.14) of innovation in Finland



Single least important internal obstacle (E1.17) and single least important external obstacle (E2.15) of innovation in Finland



Means of Estonia for questions E1.1 – E1.14 (internal obstacles of innovation); E2.1 – E2.12 (external obstacles of innovation)

Statistics[a]

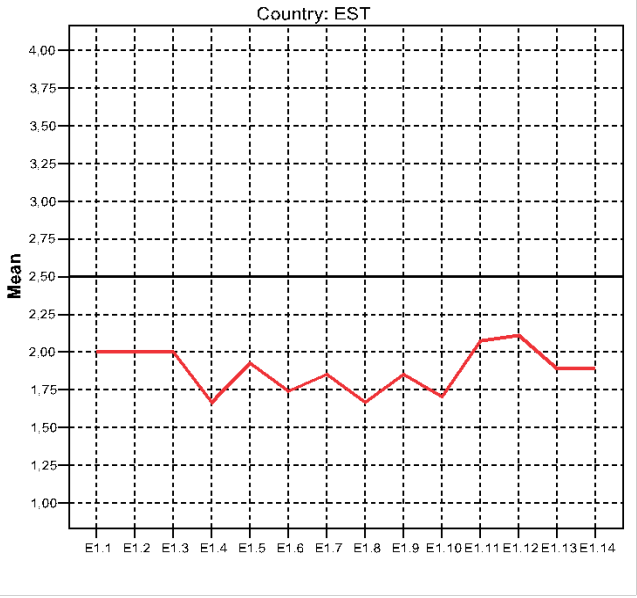
		E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7	E1.8	E1.9	E1.10	E1.11	E1.12	E1.13	E1.14
N	Valid	28	28	28	28	27	28	28	28	28	27	28	28	28	28
	Missing	0	0	0	0	1	0	0	0	0	1	0	0	0	0
Mean		1,96	2,00	2,00	1,64	1,93	1,79	1,89	1,68	1,86	1,70	2,11	2,11	1,93	1,89

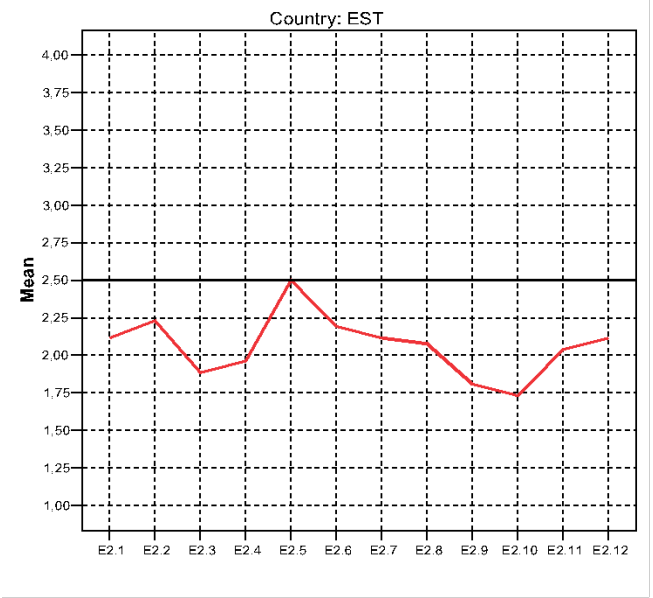
a. Country = EST

Statistics[a]

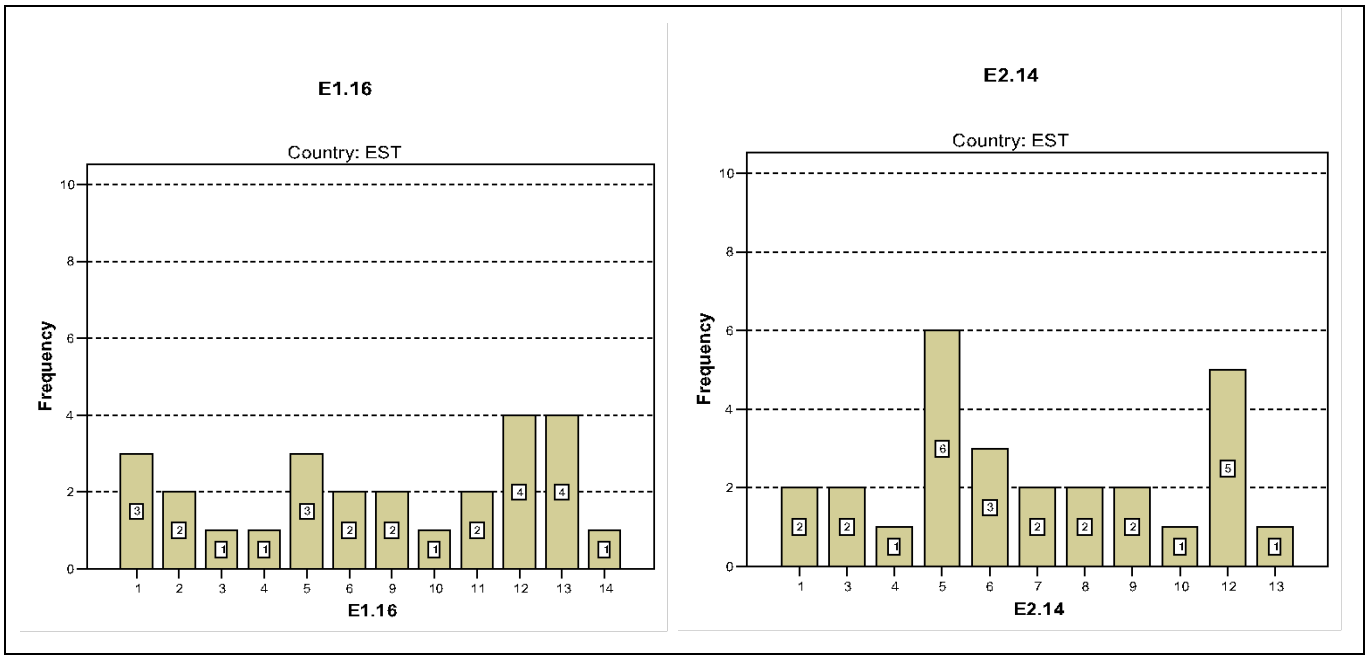
		E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E2.9	E2.10	E2.11	E2.12
N	Valid	28	28	28	28	28	28	28	28	28	28	28	26
	Missing	0	0	0	0	0	0	0	0	0	0	0	2
Mean		2,04	2,18	1,89	1,96	2,54	2,14	2,11	2,11	1,89	1,79	2,07	2,12

a. Country = EST

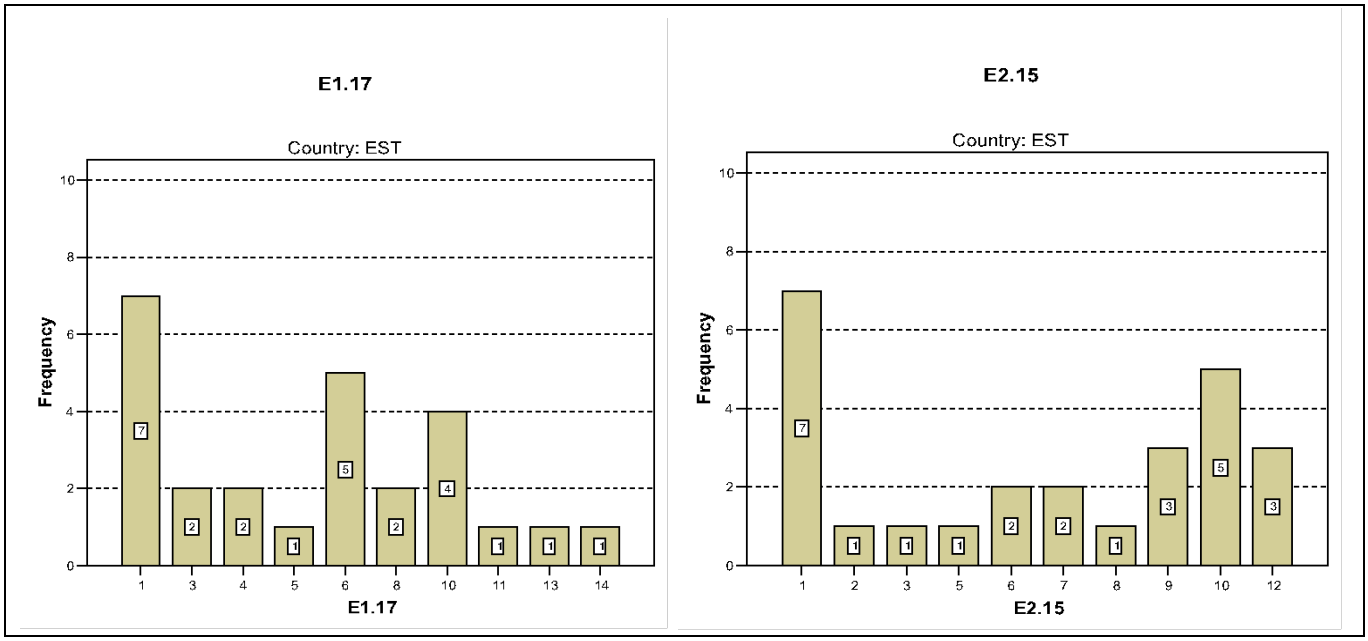




Single most important internal obstacle (E1.16) and single most important external obstacle (E2.14) of innovation in Estonia



Single least important internal obstacle (E1.17) and single least important external obstacle (E2.15) of innovation in Estonia



Annex 8 – Paired Sample T-Tests

C1 vs F1 / Goals vs Results /

Paired Samples Statistics					
		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	C1.1	3.43	77	.966	.110
	F1.1	3.71	77	.686	.078
Pair 2	C1.2	3.29	76	.977	.112
	F1.2	3.21	76	.822	.094
Pair 3	C1.3	2.72	75	1.021	.118
	F1.3	2.85	75	.940	.109
Pair 4	C1.4	3.48	79	.617	.069
	F1.4	3.43	79	.634	.071
Pair 5	C1.5	2.53	77	.995	.113
	F1.5	2.60	77	.977	.111
Pair 6	C1.6	3.18	77	.884	.101
	F1.6	3.08	77	.929	.106
Pair 7	C1.7	2.74	77	1.018	.116
	F1.7	2.95	77	.887	.101
Pair 8	C1.8	2.34	76	.946	.109
	F1.8	2.42	76	.997	.114
Pair 9	C1.9	2.24	75	.956	.110
	F1.9	2.53	75	.977	.113
Pair 10	C1.10	2.99	76	.841	.096
	F1.10	2.87	76	.772	.089
Pair 11	C1.11	3.51	77	.661	.075
	F1.11	3.64	77	.511	.058
Pair 12	C1.12	2.17	75	.964	.111
	F1.12	2.75	75	.946	.109

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	C1.1-F1.1	-.29	.704	.080	-.45	-.13	-3.559	76	.001
Pair 2	C1.2-F1.2	.08	.829	.095	-.11	.27	.830	75	.409
Pair 3	C1.3-F1.3	-.13	.875	.101	-.33	.07	-1.320	74	.191
Pair 4	C1.4-F1.4	.05	.658	.074	-.10	.20	.684	78	.496
Pair 5	C1.5-F1.5	-.06	.784	.089	-.24	.11	-.727	76	.469
Pair 6	C1.6-F1.6	.10	.699	.080	-.05	.26	1.304	76	.196
Pair 7	C1.7-F1.7	-.21	.695	.079	-.37	-.05	-2.625	76	.010
Pair 8	C1.8-F1.8	-.08	.906	.104	-.29	.13	-.760	75	.450
Pair 9	C1.9-F1.9	-.29	.835	.096	-.49	-.10	-3.044	74	.003
Pair 10	C1.10-F1.10	.12	.864	.099	-.08	.32	1.195	75	.236
Pair 11	C1.11-F1.11	-.13	.547	.062	-.25	-.01	-2.085	76	.040
Pair 12	C1.12-F1.12	-.57	.918	.106	-.78	-.36	-5.409	74	.000

Paired Samples Statistics						
		Mean	N	Std. Deviation	Std. Error Mean	
Pair 1	MEANC1	2.9264	80	.41102	.04595	
	MEANF1	3.0222	80	.42521	.04754	

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MEANC1-MEANF1	-.0958	.32201	.03600	-.1674	-.0241	-2.660	79	.009

D1 vs D2 / Internal motivating factors vs External motivating factors /

Paired Samples Statistics						
		Mean	N	Std. Deviation	Std. Error Mean	
Pair 1	MEAND1	2.9524	80	.38937	.04353	
	MEAND2	2.5800	80	.51041	.05707	

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MEAND1-MEAND2	.3724	.40039	.04476	.2833	.4615	8.318	79	.000

E1 vs E2 / Internal hampering factors vs Internal motivating factors /

Paired Samples Statistics						
		Mean	N	Std. Deviation	Std. Error Mean	
Pair 1	MEANE1	1.8479	75	.67496	.07794	
	MEANE2	1.9578	75	.68873	.07953	

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MEANE1-MEANE2	-.1099	.34782	.04016	-.1899	-.0299	-2.736	74	.008

D1E1 vs D2E2 / Internal factors vs External factors /

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	MEAND1E1	2,4337	80	,45360	,05071
	MEAND2E2	2,3077	80	,54265	,06067

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MEAND1E1-MEAND2E2	.1260	.23268	.02601	.0742	.1778	4.844	79	.000

D1D2 vs E1E2 / Supporting factors vs Hampering factors /

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	MEAND1D2	2.7500	78	.38762	.04389
	MEANE1E2	1.9248	78	.66066	.07480

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	MEAND1D2-MEANE1E2	.8252	.62567	.07084	.6841	.9662	11.648	77	.000

Annex 9 – Cases identification letter and cases in the survey sample

SPRU Science and Technology Policy Research

University of Sussex

Dear Sir or Madam,

Responding to a range of economic, political and ideological demands, the public services are under increasing pressure to develop creative ways to address fiscal restraints while fulfilling citizen demands for efficient service delivery. Nevertheless, despite the importance of innovation in governmental activities (e.g. in public services) the topic is relatively little analysed. Therefore, we have initiated a research project within SPRU, the world's leading centre for research in science, technology and innovation policy, to identify the key success-making (and hampering) factors which have influenced the successful, technologically innovative public services. The countries selected for the study are Finland, Denmark, Estonia and the UK. This study will create a stock of key information needed by the national governments and concrete institutions in supporting and securing the development of such services.

This short sheet sent personally to you as a national/international expert is a **case-identification pre-stage** of the research, which would be followed by a questionnaire-survey and face-to-face interviews with relevant individuals in the selected services. We would kindly ask you to give your professional contribution to our research by identifying **some successful, technologically innovative public services in the following countries: Finland, Estonia and the UK** (experts should provide the information only about the country they are familiar with). To redress your professional contribution you will **exclusively receive** the preliminary results of our research in summer 2005.

The services-cases we are looking for would have the following characteristics:

(a) **They are technologically innovative**, i.e. they have a significant technological component or application which significantly improves the service;
(b) **They are successful**, i.e. they have: (a) radically changed the behaviour of the introducing institution (or its unit); (b) improved significantly the take-up of the service; (c) improved significantly the quality of the service; (d) reduced significantly the time spent on the service delivery; (e) personalised the service; or (f) reduced significantly the cost of the service;
(c) **They are "public"**, i.e. services managed in the public domain (not necessarily provided), funded predominantly by government-raised income, and subject to direct/indirect control of elected politicians.

It is enough if the fulfilment of the abovementioned criteria is based on your professional opinion, i.e. the existence of special evaluations is not necessary. If you are not sure about the criteria-fulfilment of concrete cases please provide the information while stating "not sure about the criteria fulfilment".

Some examples of the potential service-cases:

The case-services suggested by you should be narrow enough to study, i.e. initiated/managed by a concrete institution (state authority, local government, municipal body, etc.), for example: Online Tax Decelerating Service of the local/regional/national Tax Board; Online Booking Service of a hospital/clinic; eTicket Service of a municipality (e.g. ID-card based public transport tickets); mParking Service of a municipality (i.e. parking payments by mobile phones); Telemedicine service provided by a hospital.

Which information do we require? Ideally the following (but as much as you can provide):

- The name and a short description of the service (and other information you feel is relevant);
- The name of the body initiating/managing the service;
- The name and contact details (post, address, phone, e-mail) of the person centrally responsible for the service management/development (*the best* person to interview about the service);
- The name and contact details of the **other experts you suggest us** to contact with the current request;
- Your contact details (name, post, address, phone, e-mail).

We would be most grateful to receive this information by 29 October 2004:

- By e-mail: o.parna@sussex.ac.uk ("expert opinion" on the subject line), or
- By post: Mr. Ott Pärna, SPRU, Freeman Centre, University of Sussex, Falmer, Brighton BN1 9QE, UK.

If you find anything unclear in our request, or you have other suggestions, please contact Mr. Ott Pärna, phone: +44 (0) 799 096 0443; e-mail: o.parna@sussex.ac.uk.

Thank you for your contribution,

Prof. Nick von Tunzelmann
Director of Research

20/10/2004

Country	Case name	Web address
UK	Worktrain website	http://www.worktrain.co.uk
UK	Travel Advice Online	http://www.fco.gov.uk/
UK	DirectGov	http://direct.gov.uk/
UK	Local Governments Improvement Gateway	http://www.idea-knowledge.gov.uk/
UK	Laboratory Equipment Purchasing System	http://www.sci-ware.com/
UK	Electronic Passport Application Service	https://www.passport-application.gov.uk/
UK	London Transport Portal	http://www.tfl.gov.uk/
UK	University/College Online Application Service	http://www.ucas.ac.uk/
UK	Practical Driving Test Online Booking	http://www.dsa.gov.uk/
UK	Transport Direct (response 1)	http://www.transportdirect.info/
UK	Transport Direct (response 2)	http://www.transportdirect.info/
UK	Community Legal Service Direct	http://www.clsdirect.org.uk/
UK	Jobcentre Plus	http://www.jobcentreplus.gov.uk/
UK	Online Purchasing Training Service	http://www.ogc.gov.uk/
UK	Vehicle Related Online Services	http://www.dvla.gov.uk/
DK	Electronic Shared Patient Record	http://www.astmacenter.dk/
DK	The Digital Hospital	
DK	Journalist Centre for Analytical Reporting	http://www.dicar.dk/
DK	Digital County Administration	http://www.nja.dk/
DK	Visual Handicap Solutions	http://www.synsinstituttet.dk/
DK	Citizen Participation in Public Debate	http://www.danmarksdebatten.dk/
DK	Distant Education for Mentally Disabled	http://www.brydisolationen.dk/
DK	A Speaking Internet Portal - All Talking	http://www.adgangforalle.dk/
DK	The Healthy Shop - Individual Health Counselling	http://www.densundecirkel.dk/
DK	E-Procurement Service Portal	https://www.gatetrade.net/
DK	E-Tax Administration	http://www.tastselv.toldskat.dk/
DK	DK Library Union Catalogue	http://bibliotek.dk/
DK	The Active Aalborg Map	http://www.aalborg.dk/
DK	The National E-Health Portal	http://www.sundhed.dk/
DK	The Digital North Denmark Projects	http://www.detdigitalenordjylland.dk/
DK	Cultural Search Database of North Jutland	http://www.noks.dk/
DK	A Business Service Portal	http://www.virk.dk/
DK	SeniorCityDenmark	http://www.senior-city.dk/
FIN	Portal of Public Sector Information in Finland	http://www.suomi.fi/
FIN	Public Sector Forms Online	https://lomake.fi/
FIN	Finnish Food Composition Database	http://www.fineli.fi/
FIN	A Guide to Citizen Influence in Local Gov.	http://www.fineli.fi/vallakas/
FIN	The Central Archive of Parliament and Jur. Publications	http://selma.linneanet.fi/
FIN	Online Crime Reporting	http://www.poliisi.fi/
FIN	Helsinki Region Journey Planner	http://www.ytv.fi/journeyplanner/
FIN	Road Weather Information Online Service	http://www.tiehallinto.fi/alk/
FIN	Statistics on the Web	http://webstat.stat.fi
FIN	The Finnish Internet School for People Abroad	http://kauko.jkl.fi/
FIN	Collection of Web Education Materials	http://www.opintoluotsi.fi/
FIN	Internet Portal for Pensions	http://www.tyoelake.fi/
FIN	E-Tax Administration	http://www.tyvi.fi/ ; http://www.vero.fi/
FIN	Consumer Guide for Online Shopping	http://www.tieke.fi/kauppa/ostoksilla/

FIN	ID Card Portal, Population Register Centre	http://www.fineid.fi/
FIN	Interactive Service Promoting Traffic Safety & Accessibility	http://www.tieliikelaitos.fi/ (KatuKanava)
FIN	MUISTI Research Database for Digi Info of Libs & Museums	http://www.lib.helsinki.fi/memory/muisti.html
FIN	Notification of Move	http://www.posti.fi/muuttoilmoitus/
FIN	Window to Finland	http://www.virtual.finland.fi/
FIN	Check Your Own Details!	http://www.vaestorekisterikeskus.fi/
EST	Mobile Parking	http://www.parkimine.ee/; http://www.emt.ee/
EST	University/College Electronic Application System	https://www.sais.ee/
EST	Estonian Internet Voting System	http://www.valimised.ee/
EST	eHealth Insurance Services	http://www.haigekassa.ee/eteenused/
EST	Official Citizen Information Portal	http://www.eesti.ee/
EST	eState - Official State Information Portal	http://www.riik.ee/
EST	Official Legal Acts Online	https://www.riigiteataja.ee/
EST	WeatherPortal	http://www.ilm.ee/
EST	Check Your Own Details!	https://portaal.riik.ee/x/kodanik/index.php?fp=querylist
EST	Land Information System	http://www.maaamet.ee/
EST	Parental and Family Benefits e-Application	http://www.eesti.ee/
EST	eUniversity Portal for eLearning	http://www.e-uni.ee/
EST	mTartu	http://www.tartu.ee/mtartu/
EST	mLibrary of Tartu Public Library	http://www.tartu.ee/mtartu/
EST	Online Database of Supreme Court Judgements	http://www.nc.ee/
EST	TOM - eDemocracy Portal	https://www.eesti.ee/tom/
EST	Personal ID Card of Estonia	http://www.id.ee/ ; http://www.pass.ee/
EST	The National Archives Online	http://ais.ra.ee/ais/
EST	eStat Services	http://www.stat.ee/
EST	Hotels Online - Hotel Booking in Baltics	http://www.balticreservations.com/
EST	State Employment Portal	http://www.amet.ee/
EST	E-Tax Administration	http://www.emta.ee/
EST	Tallinn City - Forms Online	http://www.tallinn.ee/
EST	Estonian Securities Register	https://www.e-register.ee/
EST	Energy Conservation Information Portal	http://www.kokkuhoid.energia.ee/
EST	Web Portal of ID Card Solutions	http://www.id.ee/
EST	ESTER - Library Information System	http://ester.nlib.ee
EST	Estonian Business Registry	https://info.eer.ee/

Annex 10 – One Sample Test – statistical differences between new statistical factors

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	gadv-gbasic	.03681	.22553	.02522	-.01338	.08700	1.460	79	.148
Pair 2	radv-rbasic	-.12500	.20128	.02250	-.16980	-.08021	-5.555	79	.000
Pair 3	isf1-isf2	-.08868	.27568	.03122	-.15084	-.02652	-2.841	77	.006
Pair 4	isf1-isf3	-.19161	.26374	.02986	-.25107	-.13214	-6.416	77	.000
Pair 5	isf1-isf4	-.08868	.28565	.03234	-.15308	-.02428	-2.742	77	.008
Pair 6	isf2-isf3	-.10292	.22810	.02583	-.15435	-.05150	-3.985	77	.000
Pair 7	isf2-isf4	-.00633	.24049	.02706	-.06019	.04754	-.234	78	.816
Pair 8	isf3-isf4	.10293	.26753	.03029	.04261	.16324	3.398	77	.001
Pair 9	ihf1-ihf2	-.03408	.26153	.03020	-.09425	.02610	-1.128	74	.263
Pair 10	ihf1-ihf3	.01801	.20524	.02386	-.02954	.06556	.755	73	.453
Pair 11	ihf1-ihf4	-.04354	.27515	.03199	-.10729	.02020	-1.361	73	.178
Pair 12	ihf2-ihf3	.05555	.19093	.02205	.01163	.09948	2.520	74	.014
Pair 13	ihf2-ihf4	-.00751	.26354	.03064	-.06856	.05355	-.245	73	.807
Pair 14	ihf3-ihf4	-.06156	.22760	.02646	-.11429	-.00883	-2.327	73	.023
Pair 15	esf1-esf2	-.19018	.32315	.03659	-.26304	-.11732	-5.198	77	.000
Pair 16	esf1-esf3	.18182	.34959	.03984	.10248	.26117	4.564	76	.000
Pair 17	esf1-esf4	-.06224	.32536	.03661	-.13512	.01064	-1.700	78	.093
Pair 18	esf1-esf5	.04060	.37911	.04293	-.04487	.12608	.946	77	.347
Pair 19	esf2-esf3	.37231	.31519	.03592	.30077	.44385	10.365	76	.000
Pair 20	esf2-esf4	.13035	.27478	.03111	.06839	.19230	4.189	77	.000
Pair 21	esf2-esf5	.24027	.32162	.03665	.16727	.31327	6.556	76	.000
Pair 22	esf3-esf4	-.23810	.29174	.03325	-.30432	-.17189	-7.162	76	.000
Pair 23	esf3-esf5	-.12939	.32502	.03728	-.20366	-.05512	-3.470	75	.001
Pair 24	esf4-esf5	.10684	.30269	.03427	.03860	.17509	3.118	77	.003
Pair 25	ehf1-ehf2	-.04093	.27854	.03195	-.10458	.02271	-1.281	75	.204
Pair 26	ehf1-ehf3	.01755	.23977	.02750	-.03724	.07233	.638	75	.525
Pair 27	ehf1-ehf4	-.18445	.40347	.04659	-.27728	-.09162	-3.959	74	.000
Pair 28	ehf1-ehf5	.01126	.30041	.03492	-.05834	.08086	.323	73	.748
Pair 29	ehf2-ehf3	.05848	.22842	.02620	.00628	.11068	2.232	75	.029
Pair 30	ehf2-ehf4	-.1.4001	.45980	.05309	-.24580	-.03422	-2.637	74	.010
Pair 31	ehf2-ehf5	.05105	.33318	.03873	-.02614	.12824	1.318	73	.192
Pair 32	ehf3-ehf4	-.19927	.42957	.04960	-.29810	-.10043	-4.017	74	.000
Pair 33	ehf3-ehf5	-.00450	.31931	.03712	-.07848	.06948	-.121	73	.904
Pair 34	ehf4-ehf5	.19145	.43766	.05088	.09005	.29285	3.763	73	.000

Annex 11 – Means of groups of function by country

GROUP OF FUNCTION	UK	Denmark	Finland	Estonia	ALL countries
Innovation goals					
- advanced	0.6519	0.585	0.5667	0.6925	0.6306
- basic	0.6111	0.6601	0.575	0.5575	0.5938
Innovation results					
- advanced	0.585	0.51	0.55	0.657	0.5854
- basic	0.70	0.706	0.711	0.718	0.7104
Internal Supporting factors					
- ISF1 – top management	0.578	0.50	0.544	0.542	0.542
- ISF2 – structure and culture	0.628	0.62	0.675	0.604	0.639
- ISF3 – operational management	0.696	0.785	0.76	0.702	0.73
- ISF4 – external cooperation	0.75	0.635	0.618	0.568	0.627
Internal hampering factors					
- IHF1 – top management	0.322	0.262	0.206	0.274	0.271
- IHF2 – structure and culture	0.393	0.214	0.307	0.294	0.307
- IHF3 – operational management	0.393	0.175	0.111	0.29	0.252
- IHF4 – external cooperation	0.385	0.325	0.203	0.325	0.309
External supporting factors					
- ESF1 – policy	0.548	0.489	0.469	0.506	0.50
- ESF2 – users	0.762	0.611	0.807	0.637	0.692
- ESF3 – economy	0.393	0.289	0.219	0.375	0.326
- ESF4 – technology and partners	0.607	0.533	0.596	0.53	0.553
- ESF5 – technological experiences	0.464	0.389	0.456	0.476	0.456
External hampering factors					
- EHF1 – policy	0.289	0.31	0.206	0.345	0.294
- EHF2 – risks	0.422	0.373	0.203	0.349	0.333
- EHF3 – users and partners	0.356	0.31	0.105	0.329	0.281
- EHF4 – finances	0.633	0.476	0.275	0.512	0.479
- EHF5 – laws and regulations	0.289	0.31	0.196	0.321	0.282

Note: ISF – internal supporting factor; IHF – internal hampering factor; ESF – external supporting factor; EHF – external hampering factor

Annex 12 – The ANOVA tests – means of dependent variables, determinants: country

Question / field	Dependent variable	Determinant (fixed factor)	F-stat	P-value	Differences (stat. sig.)
Innovation goals	Advanced goal (G2)	Country	3.681	0.016	Est>Dk Est>Fin
	Basic goal (G1)	Country	1.297	0.282	-
Innovation results	Advanced result (R2)	Country	2.750	0.048	Est>Dk
	Basic result (R1)	Country	0.042	0.988	-
Internal supporting factors	Top management (ISF1)	Country	0.268	0.848	-
	Structure and org. culture (ISF2)	Country	0.703	0.553	-
	Operational management (ISF3)	Country	0.872	0.459	-
	External cooperation (ISF4)	Country	2.743	0.049	Uk>Est
Internal hampering factors	Top management (IHF1)	Country	0.519	0.671	-
	Structure and org. culture (IHF2)	Country	1.293	0.283	-
	Operational management (IHF3)	Country	4.884	0.004	Uk>Dk Uk>Fin Est>Fin
	External cooperation (IHF4)	Country	1.152	0.334	-
External supporting factors	Policy (ESF1)	Country	0.479	0.698	-
	Users (ESF2)	Country	2.663	0.054	Fin>Dk
	Economy (ESF3)	Country	1.895	0.138	-
	Technology and partners (ESF4)	Country	0.711	0.548	-
	Technological experiences (ESF5)	Country	0.317	0.813	-
External hampering factors	Policy (EHF1)	Country	1.002	0.397	-
	Risks (EHF2)	Country	1.533	0.213	-
	Users and partners (EHF3)	Country	3.477	0.020	Uk>Fin Est>Fin Dk>Fin
	Finances (EHF4)	Country	1.892	0.139	-
	Laws and regulations (EHF5)	Country	0.575	0.633	-

Annex 13 – The ANOVA tests, means of dependent variables, determinant: field of innovation (A1)

Question / field	Dependent variable	Determinant (fixed factor)	F-stat	P-value	Differences (stat. sig.)
Innovation Goals	Advanced goal (G2)	Innovation field	1.945	0.075	Does not show difference
	Basic goal (G1)	Innovation field	0.497	0.833	-
Innovation Results	Advanced result (R2)	Innovation field	0.637	0.724	-
	Basic result (R1)	Innovation field	2.324	0.034	eDemocracy services (8) > General administration portals (7)
Internal supporting factors	Top management (ISF1)	Innovation field	0.223	0.979	-
	Structure and org. culture (ISF2)	Innovation field	0.316	0.944	-
	Operational management (ISF3)	Innovation field	1.575	0.157	-
	External cooperation (ISF4)	Innovation field	0.753	0.628	-
Internal hampering factors	Top management (IHF1)	Innovation field	0.383	0.909	-
	Structure and org. culture (IHF2)	Innovation field	0.909	0.505	-
	Operational management (IHF3)	Innovation field	0.462	0.858	-
	External cooperation (IHF4)	Innovation field	1.334	0.248	-
External supporting factors	Policy (ESF1)	Innovation field	0.518	0.818	-
	Users (ESF2)	Innovation field	0.465	0.857	-
	Economy (ESF3)	Innovation field	1.305	0.261	-
	Technology and partners (ESF4)	Innovation field	0.961	0.466	-
	Technological experiences (ESF5)	Innovation field	0.538	0.803	-
External hampering factors	Policy (EHF1)	Innovation field	1.857	0.090	Education services (2) > Business services (5)
	Risks (EHF2)	Innovation field	0.197	0.985	-
	Users and partners (EHF3)	Innovation field	0.360	0.922	-
	Finances (EHF4)	Innovation field	1.051	0.405	-
	Laws and regulations (EHF5)	Innovation field	1.714	0.121	-

Annex 14 – The ANOVA tests, means of dependent variables, determinant: type of innovation (A2)

Question / field	Dependent variable	Determinant (fixed factor)	F-stat	P-value	Differences (stat. sig.)
Innovation Goals	Advanced goal (G2)	Innovation type	2.896	0.061	Does not show difference
	Basic goal (G1)	Innovation type	0.106	0.899	-
Innovation Results	Advanced result (R2)	Innovation type	2.573	0.083	Does not show difference
	Basic result (R1)	Innovation type	0.017	0.983	-
Internal supporting factors	Top management (ISF1)	Innovation type	1.574	0.214	-
	Structure and org. culture (ISF2)	Innovation type	0.688	0.506	-
	Operational management (ISF3)	Innovation type	0.437	0.647	-
	External cooperation (ISF4)	Innovation type	1.917	0.154	-
Internal hampering factors	Top management (IHF1)	Innovation type	1.741	0.183	-
	Structure and org. culture (IHF2)	Innovation type	0.761	0.471	-
	Operational management (IHF3)	Innovation type	1.778	0.176	-
	External cooperation (IHF4)	Innovation type	0.783	0.461	-
External supporting factors	Policy (ESF1)	Innovation type	0.888	0.416	-
	Users (ESF2)	Innovation type	2.323	0.105	-
	Economy (ESF3)	Innovation type	2.475	0.091	Does not show difference
	Technology and partners (ESF4)	Innovation type	1.211	0.303	-
	Technological experiences (ESF5)	Innovation type	0.044	0.957	-
External hampering factors	Policy (EHF1)	Innovation type	0.387	0.680	-
	Risks (EHF2)	Innovation type	1.179	0.313	-
	Users and partners (EHF3)	Innovation type	1.225	0.300	-
	Finances (EHF4)	Innovation type	0.003	0.997	-
	Laws and regulations (EHF5)	Innovation type	0.046	0.955	-